# StorTrends®
# NAS Software
# (Version 2.2)
# User's Guide

MAN-STOR-N22
01/30/04

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## Revision History

| | |
|---|---|
| 05/15/03 | Initial release. (Version 2.0) |
| 06/30/03 | Added Mirrored OS information (Version 2.1) |
| 01/30/04 | GUI Redesign (Version 2.2) |

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## Packing List

You should have received the following:

- *StorTrends NAS Software (Version 2.2)* on CD
- *StorTrends NAS Software (Version 2.2) User's Guide* on CD
- *StorTrends NAS Software (Version 2.2) Quick Installation Guide*
- Warranty and Registration Card

# Chapter 1 Introduction

## Overview

American Megatrends StorTrends NAS software is a Linux®-based, high-performance NAS server operating system.

## Features

| Feature | Description |
|---|---|
| Microsoft® Windows® 2000 Active Directory™ support | *Active Directory*™ presents organizations with a directory service designed for distributed computing environments. *Active Directory*™ allows organizations to centrally manage and share information on network resources and users while acting as the central authority for network security. In addition to providing comprehensive directory services to a Microsoft® Windows® environment, *Active Directory*™ is designed to be a consolidation point for isolating, migrating, centrally managing, and reducing the number of directories that companies require.<br><br>*Active Directory*™ is the integral directory service within the Microsoft® Windows® 2000 operating system. This service improves manageability, enables security and extends interoperability between Microsoft® Windows® 2000 and other operating systems. |
| ACL (Access Control List) support | An ACL is a table that tells the system's operating system the access rights each user has to a directory or file. The directory or file has a security attribute that identifies its access control list. The list has an entry for each system user with access privileges, such as read and write.<br><br>**Note:** Execute permission cannot be set from the Web-based UI (WebUI).<br><br>Microsoft® Windows® NT/2000, Novell® NetWare®, Hewlett-Packard® OpenVMS™ and UNIX® system-based systems are among the operating systems that use access control lists. The list is implemented differently by each operating system. |
| snapshot support | A snapshot service gives you a nearly instantaneous virtual copy of your storage volume with no interruption of service. The underlying backup technology creates an instantaneous copy of the data being backed up. This is typically accomplished by splitting a mirrored set of disks or creating a copy of a disk block when it is written, preserving the original. At restore time, the original is made available immediately, resulting in almost instantaneous restores.<br><br>**Note:** Snapshots can be scheduled. |

Cont'd

## **Features,** Continued

| Feature | Description |
|---|---|
| Network Information System (NIS) support | Developed by Sun™ Microsystems, NIS is a distributed naming and directory service originally called Yellow Pages™ or YP. It is a mechanism for identifying and locating network objects and resources. It provides a uniform storage and retrieval method for network-wide information in a transport-protocol and media-independent fashion.<br><br>NIS is a network naming and administration system typically used for smaller networks. Using NIS, each host, client or server in the system has knowledge about the entire system. A user at any host can get access to files or applications on any host in the network with a single user identification and password. It is intended for use on local area networks. NIS uses the client/server model and the Remote Procedure Call (RPC) interface for communication between hosts. NIS consists of a server, a library of client programs, and some administrative tools. NIS is often used with the Network File System (NFS). NIS is a UNIX® system-based application. |
| journaling support | A Journaling File System (JFS) enables easy file system recovery and ensures no loss of data in the event of an unscheduled downtime. It provides efficient formatting when new drives are added and it allows quick recovery after abnormal shutdowns. |
| Apple® systems support | ● Enables the connection of Apple® systems to the NAS server<br>● Apple® systems can connect and share a file using two methods - TCP/IP and AppleTalk®<br>● to share files, Apple® systems needs a network file protocol called AppleTalk® File Protocol (AFP), similar to NFS or CIFS.<br>● AppleTalk® allows the StorTrends NAS software to be used in a pure Apple® systems environment |
| NetWare® system support | ● enables the connection of NetWare® systems to the NAS server<br>● NetWare® systems connect using IPX<br>● to share files, NetWare® uses NCP® (NetWare Core Protocol®)<br>● IPX allows the StorTrends NAS software to be used in a pure NetWare® environment |
| Linux®/UNIX® system support | ● Enables the connection of UNIX® systems to the NAS server<br>● UNIX® systems can connect using TCP/IP<br>● to share files, UNIX® systems uses NFS (Network File System) |
| Microsoft® Windows® support | ● enables the connection of Microsoft® Windows® systems to the NAS server<br>● Microsoft® Windows® systems can connect using TCP/IP<br>● to share files, Microsoft® Windows® uses CIFS (Common Internet File System) |
| industry standard protocol support for configuration, management and storage | ● NTP: (Network Time Protocol) synchronizes the time of the NAS server automatically<br>● SNMP: (Simple Network Management Protocol) supports enterprise management software solutions<br>● SMTP: (Simple Mail Transport Protocol) sends mail alerts |
| Mirrored Operating System (OS) support | ● Mirrored OS support |

Cont'd

## **Features,** Continued

| Feature | Description |
|---|---|
| file system protocol support | ● CIFS (Common Internet File System): is the file sharing protocol used in Microsoft® Windows® based networks. With this support, the shared storage in the NAS box is seamlessly accessible from Microsoft® Windows® based client systems.<br>● NFS™ (Network File System): the most common file sharing protocol used in various UNIX® systems, supports the sharing of storage as NFS™ shares so other UNIX® system-based clients can access the storage.<br>● HTTP<br>● FTP |
| share management | ● Mixed Protocol Security: StorTrends NAS software makes it possible to share the storage across operating system platforms like Microsoft® Windows® and UNIX®. When more than one user is trying to modify the shared data, it prevents the data from being corrupted by locking the shared file, preventing multiple writes from different users.<br>● Quota: StorTrends NAS software provides quota support on a per volume basis. This quota can be set for every individual user. If the quota is set to zero, it means the user has unlimited storage access. If the quota is set to a particular size it means the user has only that much amount of storage at his/her access in that volume. |
| Domain integration | Microsoft® Windows® Domain Integration: StorTrends NAS software supports user authentication from a Microsoft® Windows® domain controller. The software can be configured to interact with the domain controller in the Microsoft® Windows® network, so the password authentication can be completed by the domain controller instead of the NAS server. |
| disk functionality | ● RAID level 0 (striping, for performance)<br>● RAID level 1 (mirroring, for reliability)<br>● RAID level 5 (parity, for performance and reliability) |
| backup and recovery | NDMP (Network Data Management Protocol): is the industry standard network based tape backup protocol. The data can be backed up and restored using any NDMP compatible backup software.<br><br>**Note:** Incremental backup is supported. |
| hardware health monitoring | StorTrends NAS software monitors the hardware health in American Megatrends backplanes and alerts the administrator of their status. Health monitoring includes the following:<br><br>● ambient temperature<br>● system voltages<br>● fan speed<br><br>General Events includes the following:<br><br>● unexpected shutdown<br>● insertion and removal of add-on devices<br>● volume related event (created/deleted)<br>● disk related event (inserted/removed)<br>● backup event (backup successful/end of tape reached) |

Cont'd

## **Features,** Continued

| Feature | Description |
|---|---|
| alert notification | StorTrends NAS software has an alert manager that sends out alerts using the following methods:<br><br>● SNMP traps<br>● E-mail alerts<br>● LCD<br>● Local event log<br><br>All the events are stored in a local event log. Based on the configuration, the alert manager sends the alerts to SNMP trap and e-mail destinations. |
| remote management | ● Web-based UI (WebUI): allows the NAS server to be configured via an Internet Explorer® web browser. This web-based user interface (UI) has a detailed configuration and information page that allows you to configure the system and get more information about the system. It has a detailed, context-sensitive online help application on each of the following pages:<br><br>● configuration<br>● information<br><br>● SNMP: (Simple Network Management Protocol): to enable the management of the configuration of the NAS server via an enterprise management solution, the StorTrends NAS software implements an SNMP agent that provides most configuration and functionality from a web-based UI. |
| LCD-based configuration and information (custom OEM feature) | ● Configuration: The LCD can be used to configure the StorTrends NAS software. It can be used to configure network parameters and set the DHCP or static IP address for the servers, and to shut down and power cycle the system.<br>● Information: StorTrends NAS software uses the LCD to display important information about:<br>● processor and memory usage<br>● Disk status for each disk in the system<br>● Volume status for each volume in the system |
| upgrades and updates | ● Field upgrade: StorTrends NAS software can be upgraded via the network. It will upgrade itself to the latest version, if an upgrade is available on an FTP server and the FTP directory details are inputted to the system via the web-based UI by the administrator.<br>● Fail-safe upgrade: if, for any reason, the newer system image is corrupted, or if network problems prevent the software from downloading the newer image fully before upgrading, the software will cancel the upgrade by itself. |
| security | ● SSL encryption is supported. Use the following format to access it using SSL encryption:<br><br>`https://nasxxxxxxxxxx` |

# Chapter 2 Quick Installation

## Before You Start

### Prerequisites

Before you can install the StorTrends NAS software into your StorTrends 2104 NAS server, you must meet the minimum system requirements. See the table below:

| Item | Description |
|---|---|
| processor/speed | Any Intel® Pentium® 4 processor or Intel® Celeron 478-pin FCPGA processor can be installed into your StorTrends 2104 server. |
| system memory | You need to install at least 512 MB of system memory. Install 1 GB of system memory for optimal performance. |
| hard disk drive space | You need at least 1 GB of space on the Primary Master IDE hard disk drive dedicated to the StorTrends NAS software. The StorTrends NAS software uses 512 MB for itself and 512 MB for swap files. The remaining hard disk drive space is used for storage. |
| host bus controller card | The StorTrends 2104 server has two onboard IDE controllers that are fully supported by the StorTrends NAS software.<br><br>See *Appendix A*, *Expansion Card Compatibility List* for a list of supported expansion cards. |
| network card | The StorTrends 2104 server has two onboard network adapters that are fully supported by the StorTrends NAS software.<br><br>**Note:** The StorTrends 2104 server does not support an additional network card. |
| CD-ROM drive | You must have a USB or ATAPI CD-ROM drive attached to the StorTrends 2104 server during the installation of the StorTrends NAS software. Your StorTrends 2104 server's BIOS must be set to boot up off the CD-ROM drive.<br><br>**Note:** Once the StorTrends NAS software is fully installed and operational on your StorTrends 2104 server, you can physically remove the CD-ROM drive. |
| keyboard | You must have a USB or PS/2 keyboard attached to the StorTrends 2104 server during the installation of the StorTrends NAS software.<br><br>**Note:** Once the StorTrends NAS software is fully installed and operational on your StorTrends 2104 server, you can physically remove the keyboard. |

Cont'd

**Prerequisites, Continued**

| Item | Description |
|---|---|
| mouse | You can use a USB or PS/2 mouse to install the StorTrends NAS software in *Graphical Mode* onto your StorTrends 2104 server. If you do not have a mouse attached, then you can only install the StorTrends NAS software in *Text Mode*.<br><br>**Note:** Once the StorTrends NAS software is fully installed and operational on your StorTrends 2104 server, you can physically remove the mouse. |
| monitor | You must have a monitor attached to the StorTrends 2104 server during the installation of the StorTrends NAS software. The VGA monitor must support a screen resolution of 640 x 480 or greater.<br><br>**Note:** Once the StorTrends NAS software is fully installed and operational on your StorTrends 2104 server, you can physically remove the monitor. |

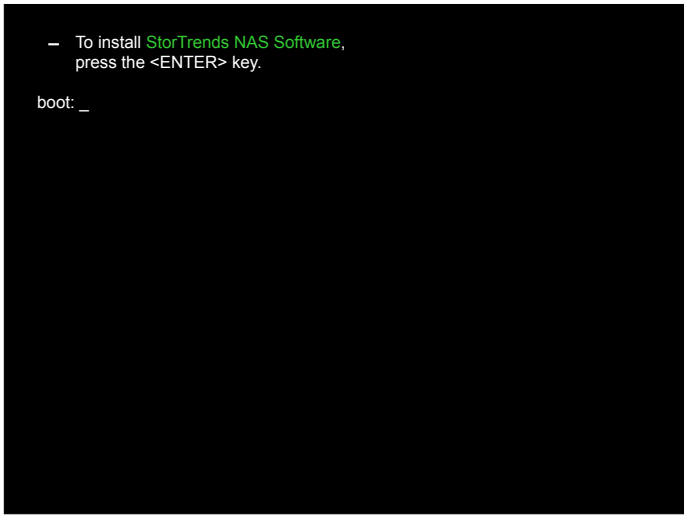
**Note:** The following items are not required during the installation and use of the StorTrends NAS software:

- modem
- sound card
- parallel port
- floppy drive

## Installation

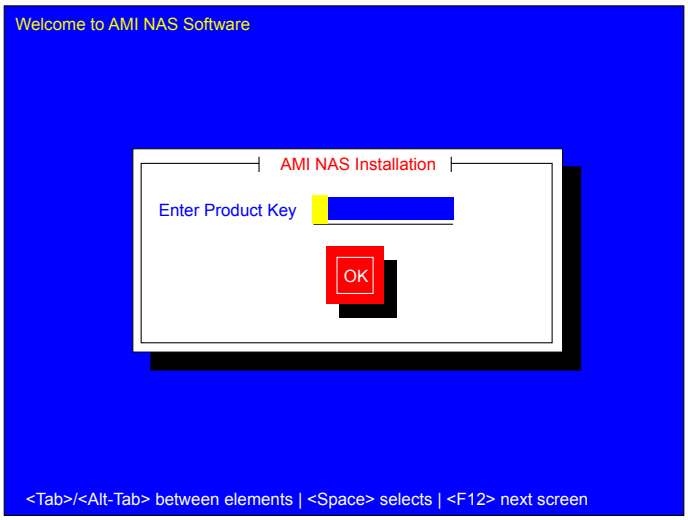
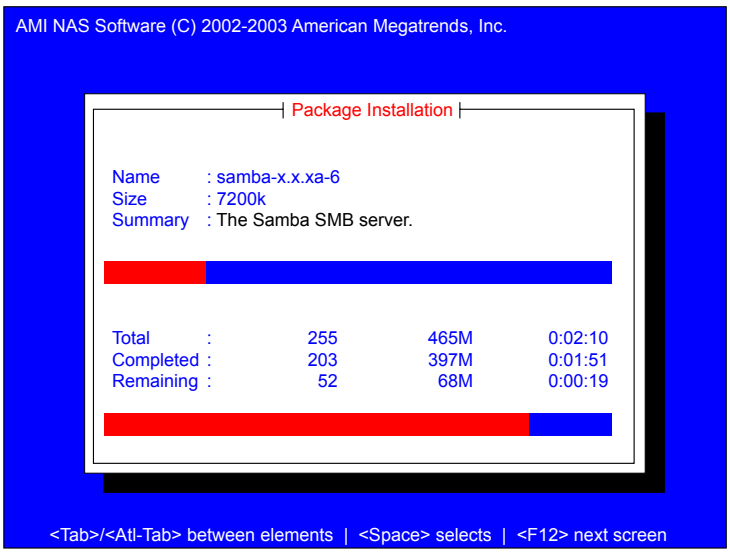
### Text Mode

Use the following steps to install the StorTrends NAS software into the StorTrends 2104 server in *Text Mode*.

| Step | Action |
|---|---|
| 1 | Power down your StorTrends 2104 server. Verify that your StorTrends 2104 server meets the minimum system requirements to install the *StorTrends NAS Software*.<br><br>● any Intel® Pentium® 4 processor or Intel® Celeron 478-pin FCPGA processor can be installed into your StorTrends 2104 server<br>● a 101/104 keyboard (PS/2 or USB)<br>● a VGA monitor that supports a screen resolution of 640 x 480 or greater<br>● a USB CD-ROM drive<br>● at least 512 MB of system memory<br>● at least 1 GB of hard disk drive space<br><br>**Note:** You can also opt to use an IDE CD-ROM drive. Attach the CD-ROM drive to the IDE connector on the hard disk drive tray in the third bay from the left. If you try to load from any other bay, the installation can fail. |
| 2 | Power on your StorTrends 2104 server and insert the *StorTrends NAS Software (Version 2.2)* CD. Allow your StorTrends 2104 server to boot up off the *StorTrends NAS Software* CD.<br><br>**Note:** The system BIOS must be set to boot from the CD-ROM first. |
| 3 | After your StorTrends 2104 server boots up, you are prompted to install the *StorTrends NAS Software*. Press the <ENTER> key to begin the installation.<br><br>  |

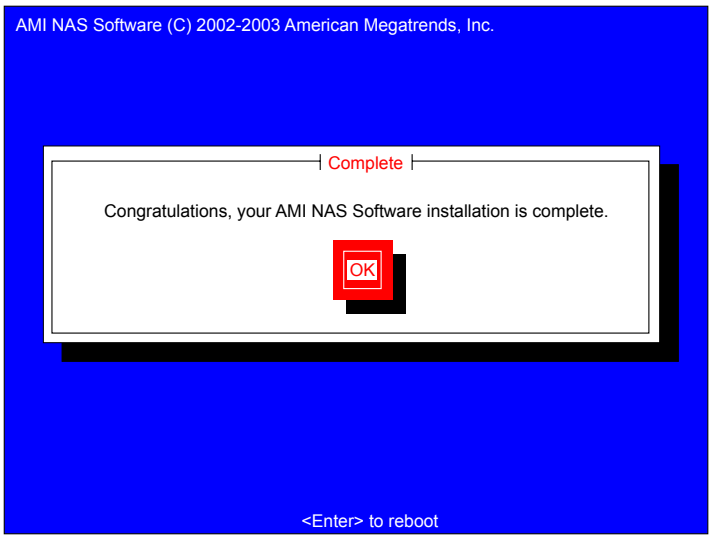
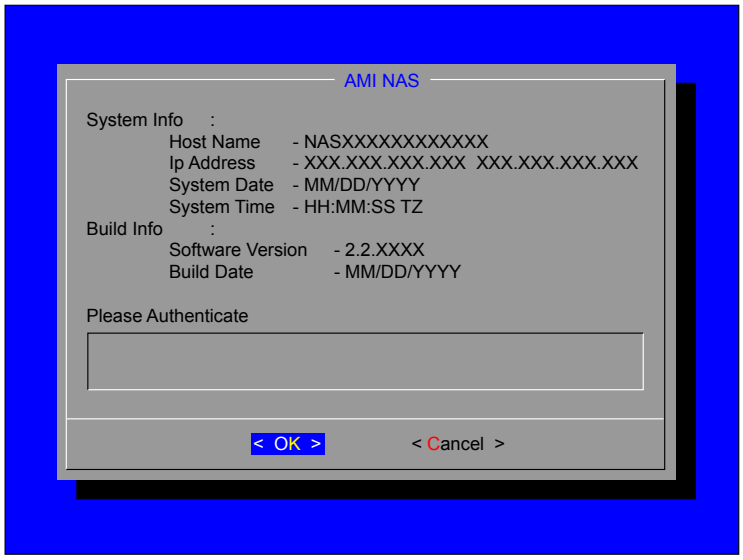
Cont'd

### Text Mode, Continued

| Step | Action |
|---|---|
| 4 | When prompted, enter the *StorTrends NAS Software* Product Key. The Product Key can be found on your *StorTrends NAS Software* CD envelope.<br>  |
| 5 | The *StorTrends NAS Software* installation shows its progression.<br>  |

Cont'd

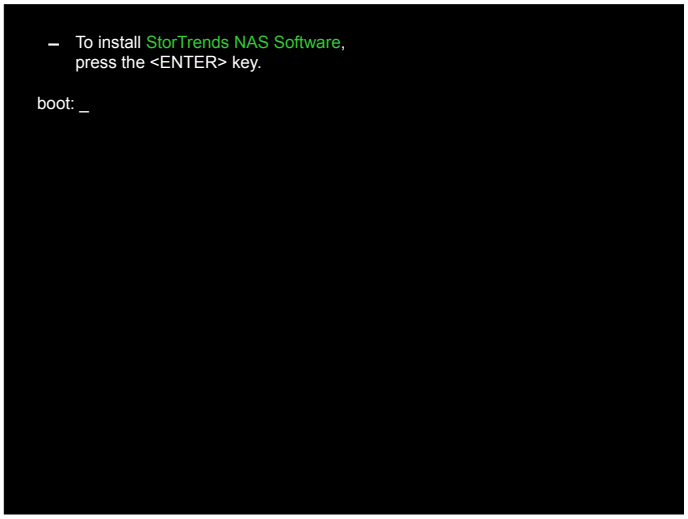
### Text Mode, Continued

| Step | Action |
|---|---|
| 6 | Once the installation is complete, press the <ENTER> key.<br>  |
| 7 | Power down the StorTrends 2104 NAS server. At this point, you can physically remove the CD-ROM drive. |
| 8 | Once the *StorTrends NAS software* has fully booted, you can note the system's IP address and power off the monitor.<br>  <br>From this point on, you do not need a monitor or keyboard to be physically attached to your NAS server.<br>**Note:** You can gracefully power down the system from the WebUI. See the *Maintenance* subsection in the *System* section located in *Chapter Three, Configuring Your NAS Server* for more information on how to do this. |
| 9 | Congratulations! You have successfully installed the StorTrends NAS software on your StorTrends 2104 server. |

Cont’d

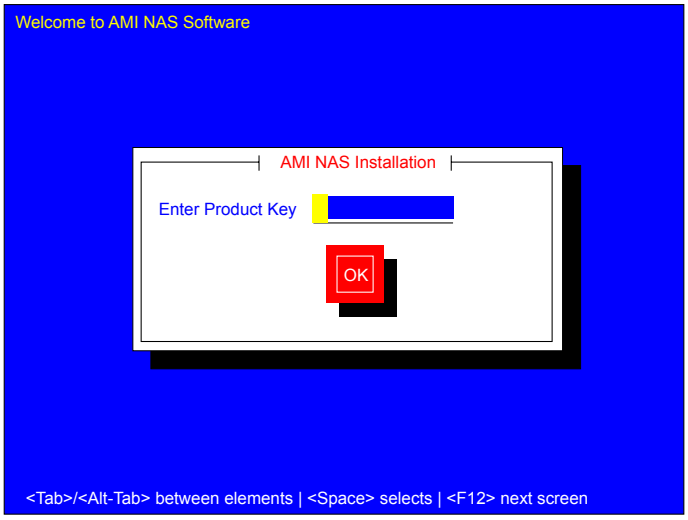
### Graphics Mode

Use the following steps to install the StorTrends NAS software into the StorTrends 2104 server in *Graphics Mode*.

| Step | Action |
|---|---|
| 1 | Power down your StorTrends 2104 server. Verify that your StorTrends 2104 server meets the minimum system requirements to install the *StorTrends NAS Software*.<br><br>● any Intel® Pentium® 4 processor or Intel® Celeron 478-pin FCPGA processor can be installed into your StorTrends 2104 server<br>● a 101/104 keyboard (PS/2 or USB)<br>● a mouse (PS/2 or USB)<br>● a VGA monitor that supports a screen resolution of 640 x 480 or greater<br>● a USB CD-ROM drive<br>● at least 512 MB of system memory<br>● at least 1 GB of hard disk drive space<br><br>**Note:** You can also opt to use an IDE CD-ROM drive. Attach the CD-ROM drive to the IDE connector on the hard disk drive tray in the third bay from the left. If you try to load from any other bay, the installation can fail. |
| 2 | Power on your StorTrends 2104 server and insert the *StorTrends NAS Software (Version 2.2)* CD. Allow your StorTrends 2104 server to boot up off the *StorTrends NAS Software* CD.<br><br>**Note:** The system BIOS must be set to boot from the CD-ROM first. |
| 3 | After your StorTrends 2104 server boots up, you are prompted to install the *StorTrends NAS Software*. Press the <ENTER> key to begin the installation.<br><br>  |

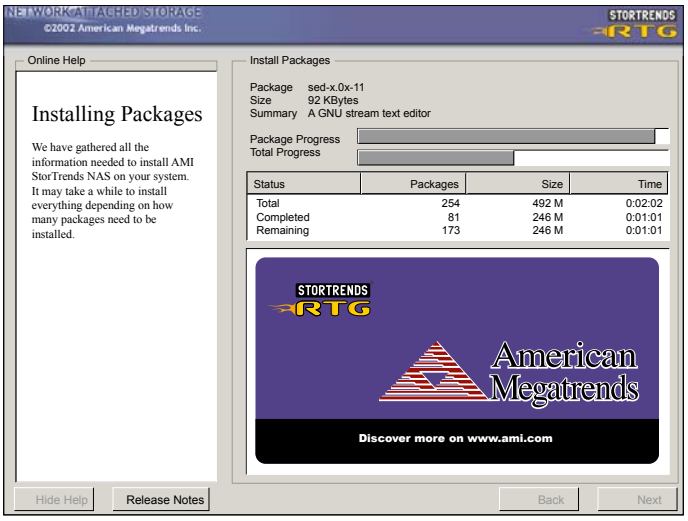
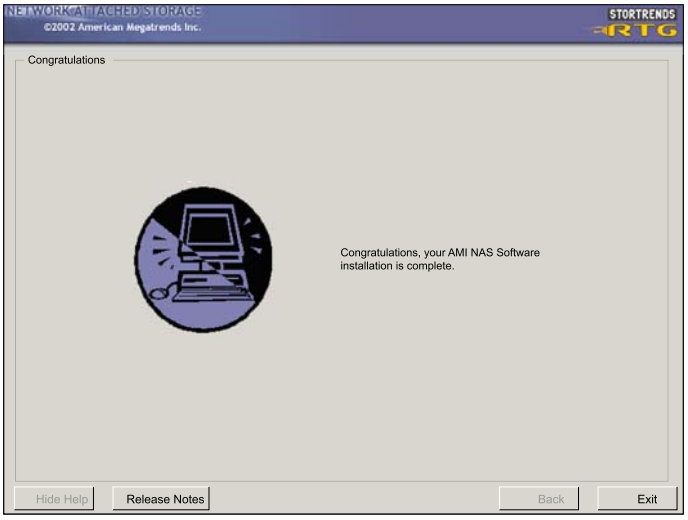
Cont'd

### Graphics Mode, Continued

| Step | Action |
|---|---|
| 4 | When prompted, enter the *StorTrends NAS Software* Product Key. The Product Key can be found on your *StorTrends NAS Software* CD envelope.<br>  |
| 5 | The *StorTrends NAS Software* installation begins.<br> |

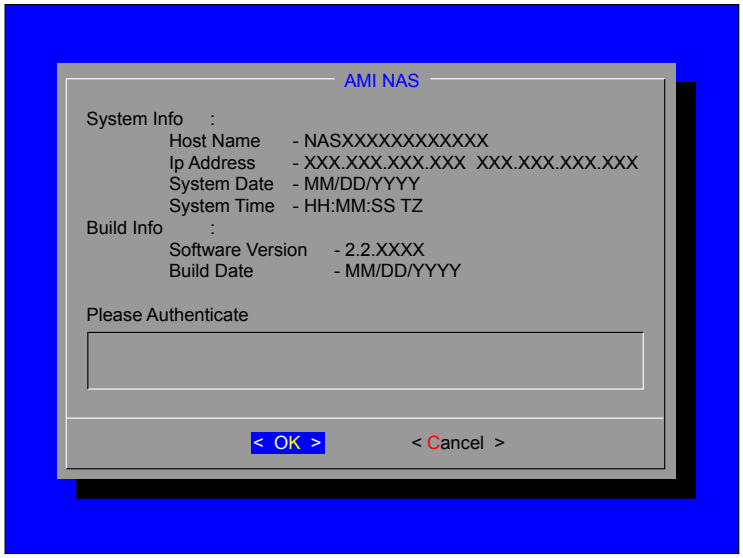
Cont'd

### Graphics Mode, Continued

| Step | Action |
|---|---|
| 6 | The *StorTrends NAS Software* installation shows its progression.<br>  |
| 7 | Once the installation is complete, left click the *Exit* button.<br>  |
| 8 | Power down the StorTrends 2104 NAS server. At this point, you can physically remove the CD-ROM drive. |

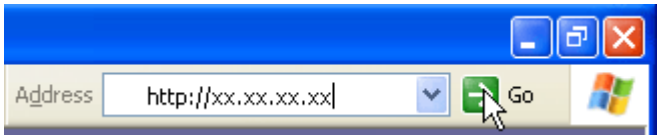
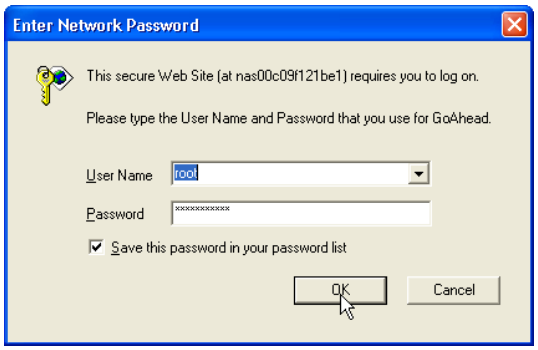
Cont'd

### Graphics Mode, Continued

| Step | Action |
|---|---|
| 9 | Once the *StorTrends NAS software* has fully booted, you can note the system's IP address and power off the monitor.<br>  <br><br>From this point on, you do not need a monitor or keyboard to be physically attached to your NAS server.<br>**Note:** You can gracefully power down the system from the WebUI. See the *Maintenance* subsection in the *System* section located in *Chapter Three, Configuring Your NAS Server* for more information on how to do this. |
| 10 | Congratulations! You have successfully installed the StorTrends NAS software on your StorTrends 2104 server. |

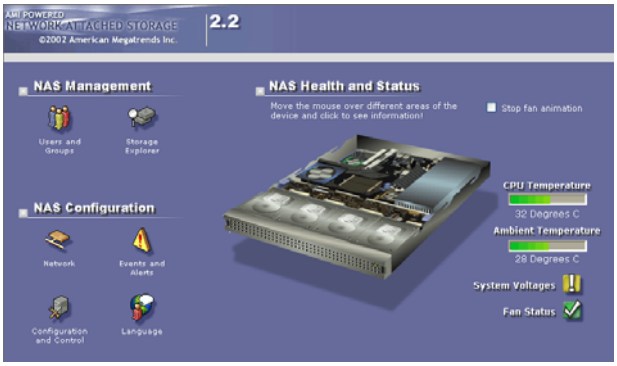
## Connecting

Use the following steps to connect to your StorTrends 2104 server.

| Step | Action |
|---|---|
| 1 | From a client system on the same network, launch Microsoft® Internet Explorer 6.0 or later. Type the IP address of the StorTrends 2104 server that you just set up into the Web address field and press <ENTER> or left click the *Go* button.<br>  <br>**Note:** If you know the MAC address of the network adapter, type the default system name (host name) in the Web address field, and press the <Enter> key.<br>The default system name is `nasxxxxxxxxxxxx`, where `xxxxxxxxxxxx` is the MAC address. For example, if your MAC address is 00112233445566, type the following:<br>**`http://nas00112233445566`**<br> |
| 2 | Once you press the <ENTER> key or left click the *Go* button, you are immediately prompted for a user name and password.<br>  <br>The default user name and password is as follows:<br>Default user name: **`root`**<br>Default password: **`password`** |

Cont'd

| Step | Action |
|---|---|
| 3 | The AMI NAS 2.2 web client appears. You are now connected to the NAS server. |



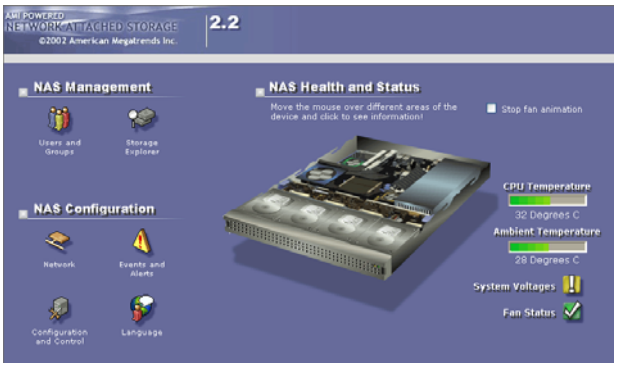
# Chapter 3 Using Your NAS Server

## Overview

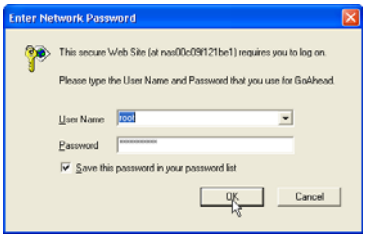
Once the *StorTrends NAS Software* is installed on your StorTrends 2104 server, it can be operated without a keyboard, monitor, or pointing device physically attached to it. You can configure your NAS server using the web-based user interface (WebUI), which can be accessed from a client system on the same or a connecting network.

**Note:** For certain configuration tasks and for troubleshooting, you can physically connect a keyboard, monitor, and pointing device.

This chapter provides information necessary to perform the initial configuration of your NAS server.




## Default User Name and Password


Enter Network Password
This secure Web Site (at nas00c09f121be1) requires you to log on.
Please type the User Name and Password that you use for GoAhead.
User Name
root
Password
Save this password in your password list
OK
Cancel

When you first try to access your StorTrends 2104 server, you will be prompted to enter a user name and password. Login as root. The default root password is as follows:

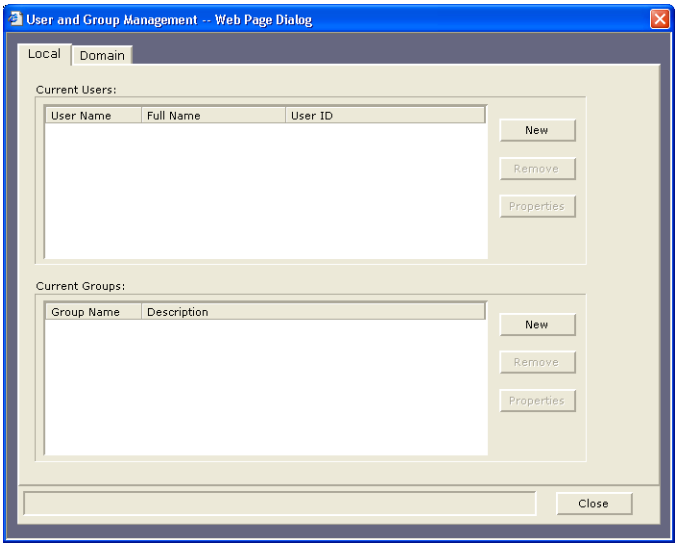
| Field | Default |
|---|---|
| User Name | `root` |
| Password | `password` |

**Note:** When you login using the root password, you have full administrative powers. It is advised that once you login, you change the root password.

## NAS Management Section

| Name | Icon | Description |
|---|---|---|
| Users and Groups | | This section allows you to do the following:<br>● view the user list.<br>● add and delete users.<br>● edit and view user information.<br>● edit group information.<br>● add and delete groups.<br>● you can also add and remove specific users from any group on the NAS server. |
| Storage Explorer | | This section allows you to do the following:<br>● view the properties of the NAS server.<br>● view backup devices that are attached to the NAS server.<br>● view and manage Volumes.<br>● view and manage shares. |

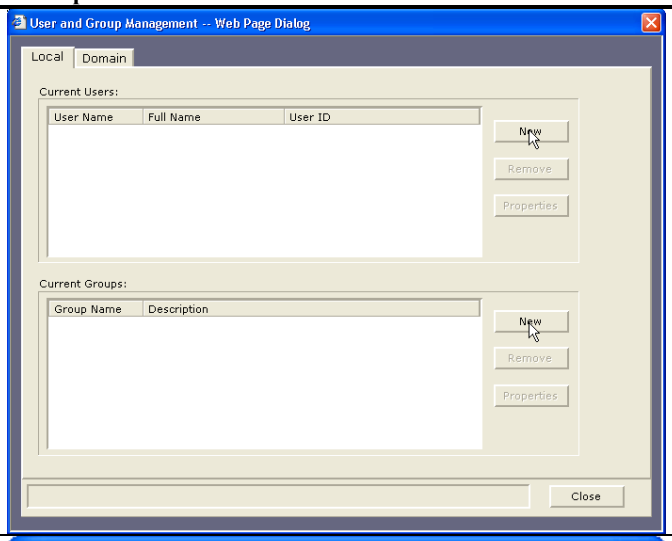
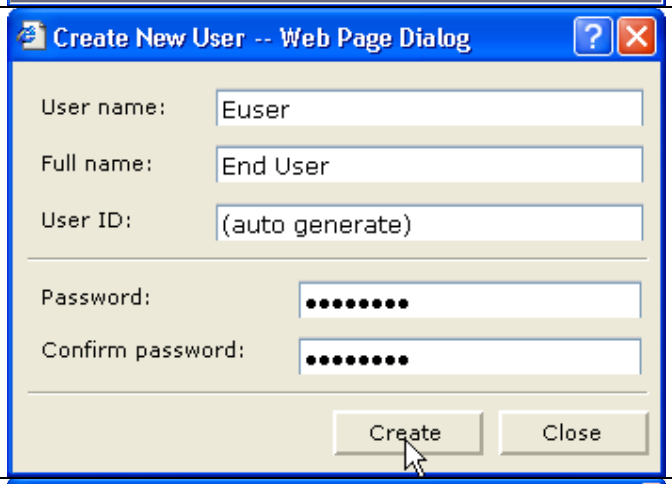
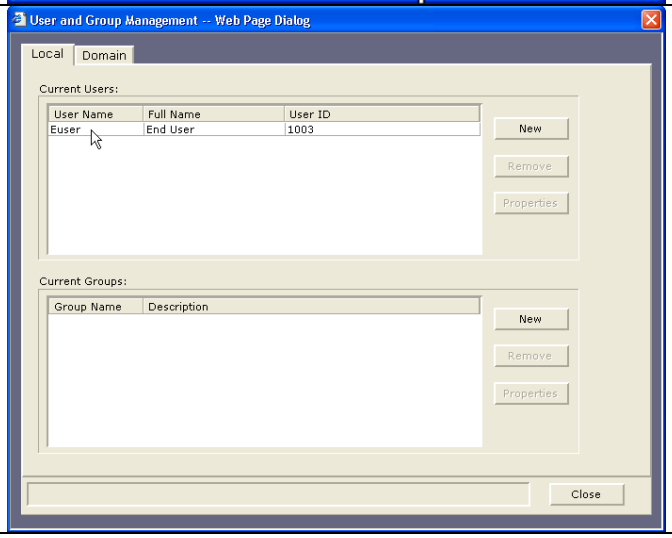
## Users and Groups



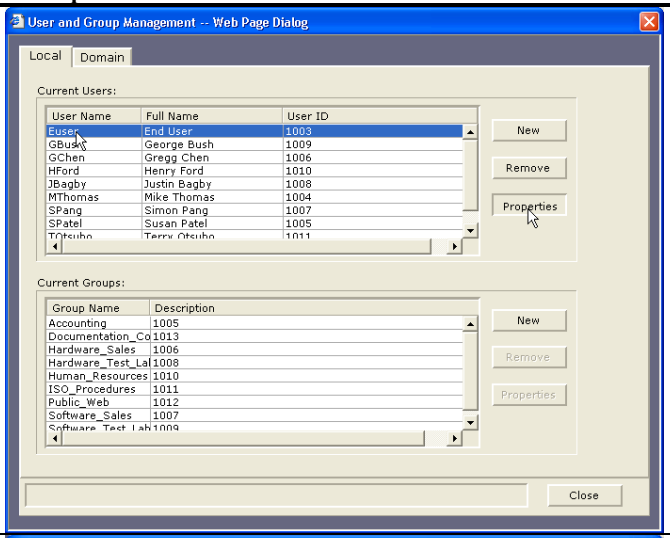
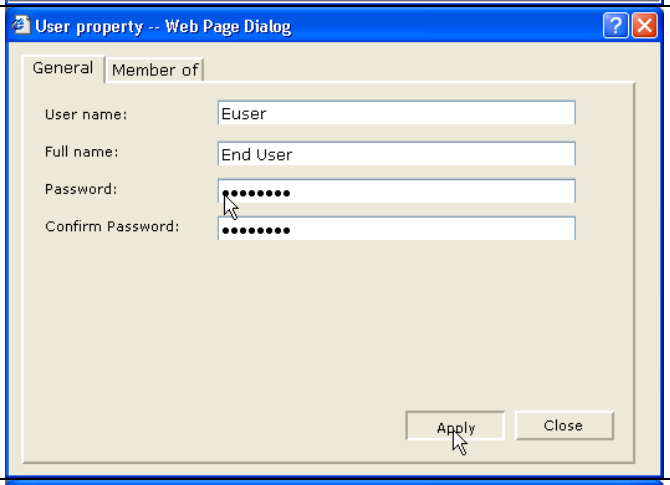
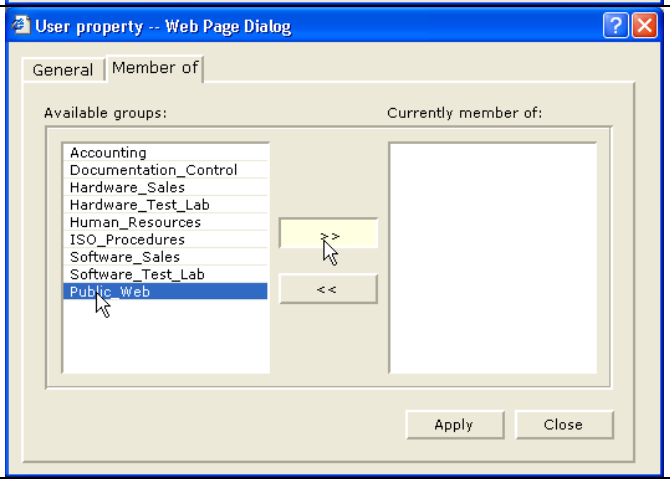

This section allows you to do the following:

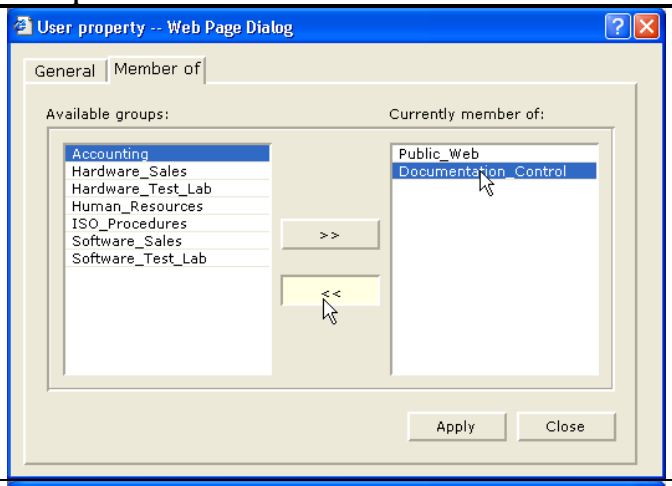
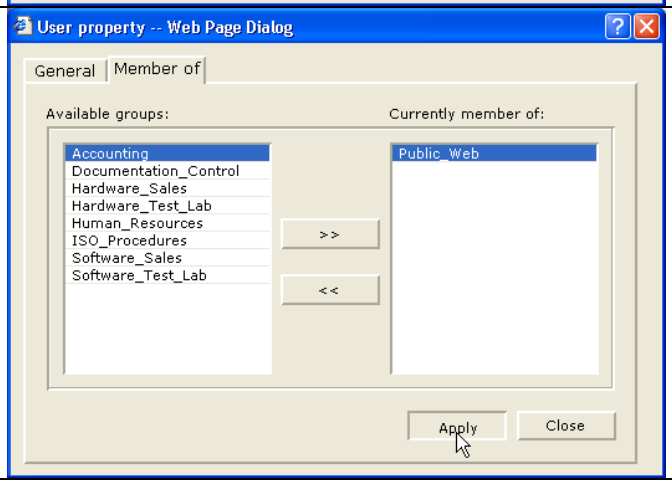
- view the user list.
- add and delete users.
- edit and view user information.
- edit group information.
- add and delete groups.
- you can also add and remove specific users from any group on the NAS server.

## Creating a User

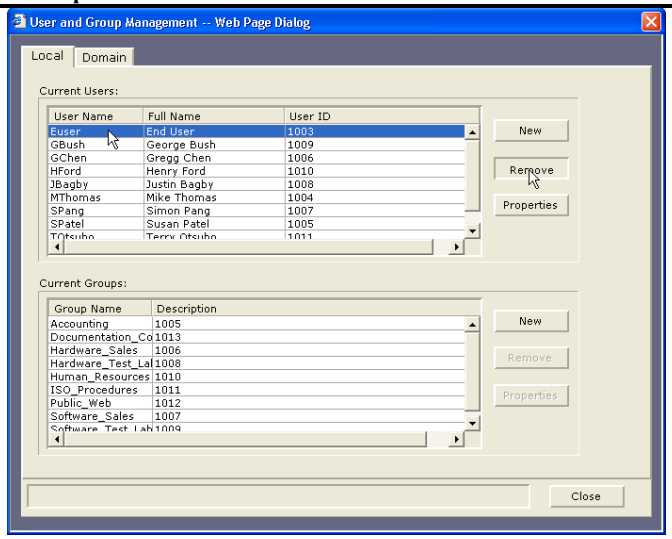
| Step | Description |
|---|---|
| 1 |  |
| 2 |  |
| |  |

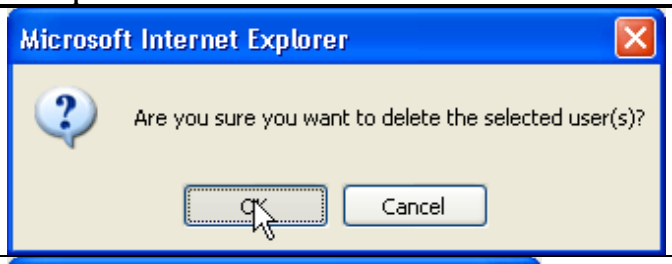
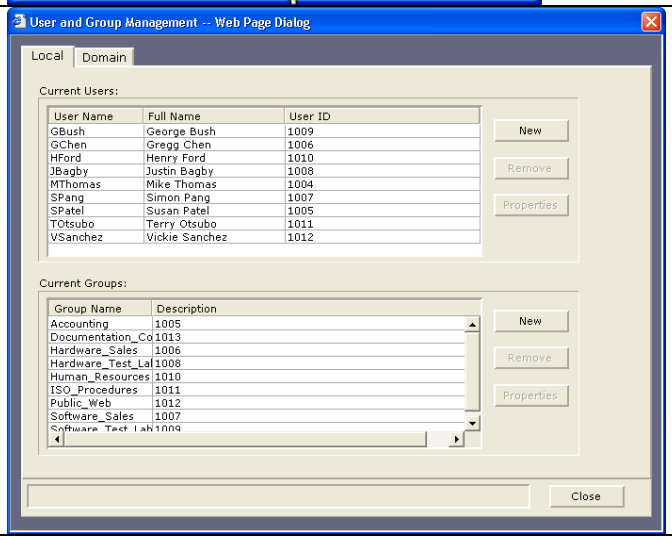
## Editing a User

| Step | Description |
|---|---|
| 1 |  |
| 2 |  |
| 3 |  |

| Step | Description |
|---|---|
| 4 |  |
| 5 |  |

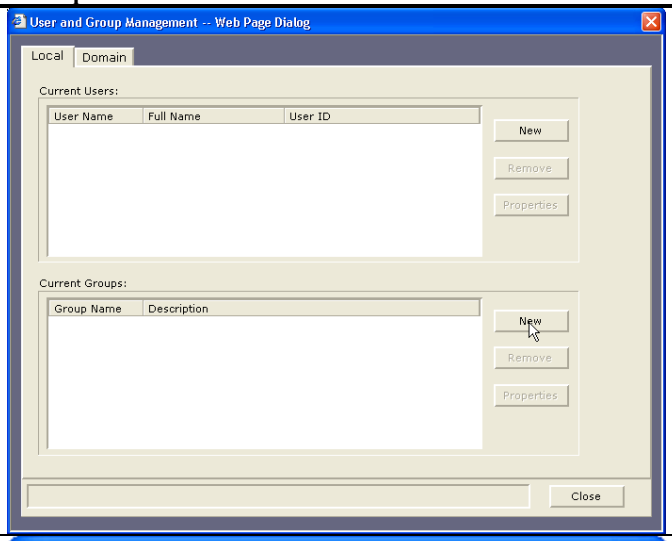
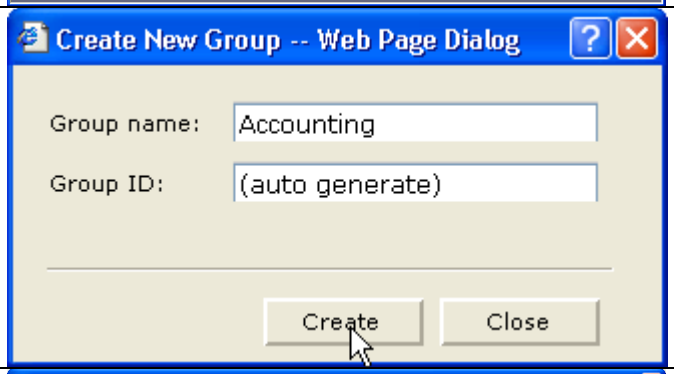
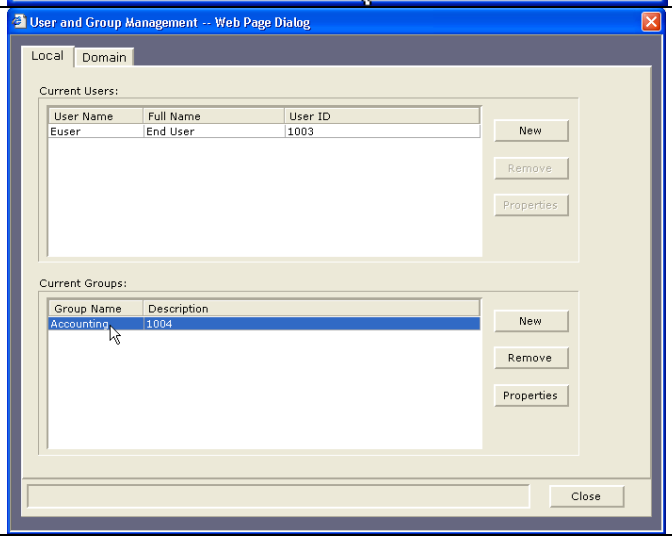
## Deleting a User

| Step | Description |
|---|---|
| 1 |  <br>**Note:** You can select multiple *Users* by left clicking on each individual *User*. |

| Step | Description |
|---|---|
| 2 |  |
| 3 | |
| 4 |  |

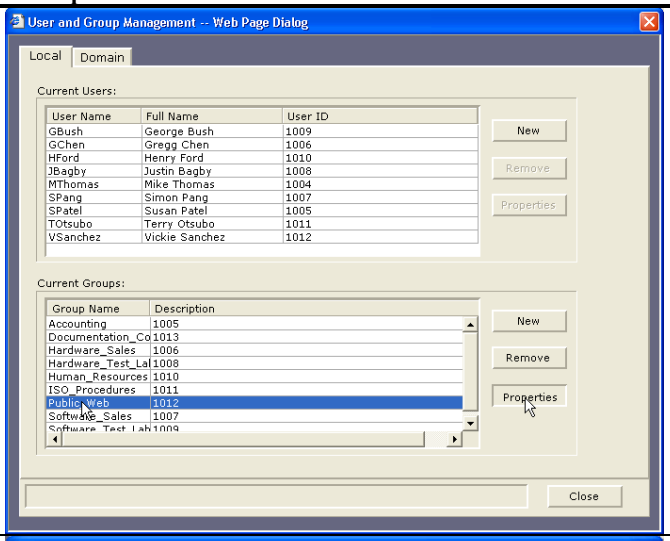
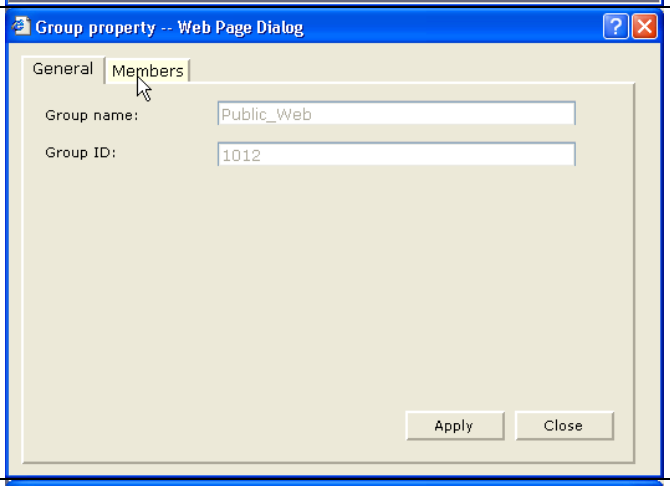
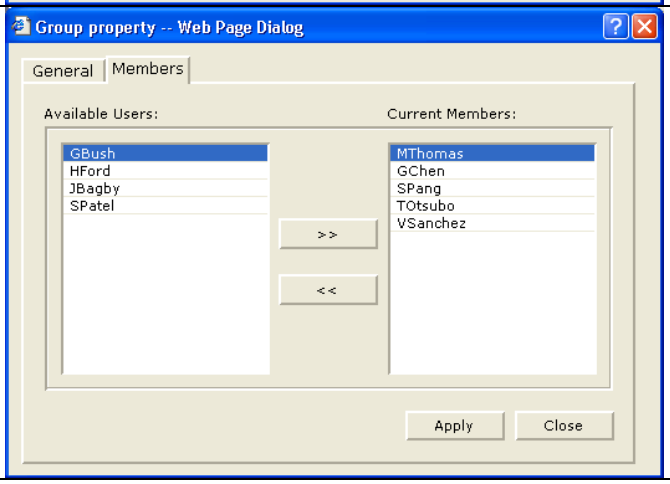
## Creating a Group

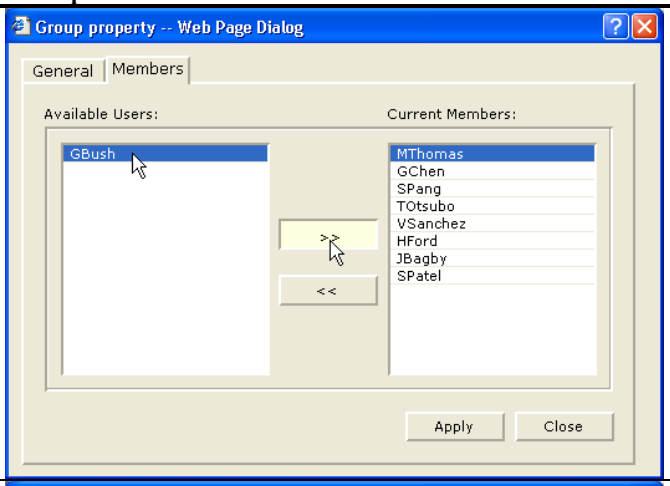
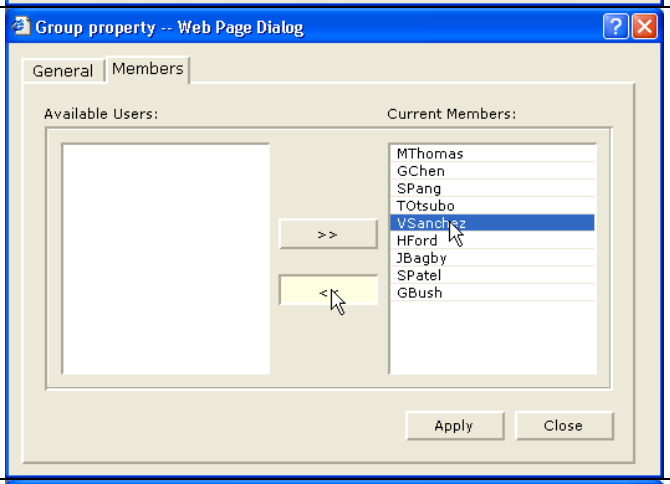
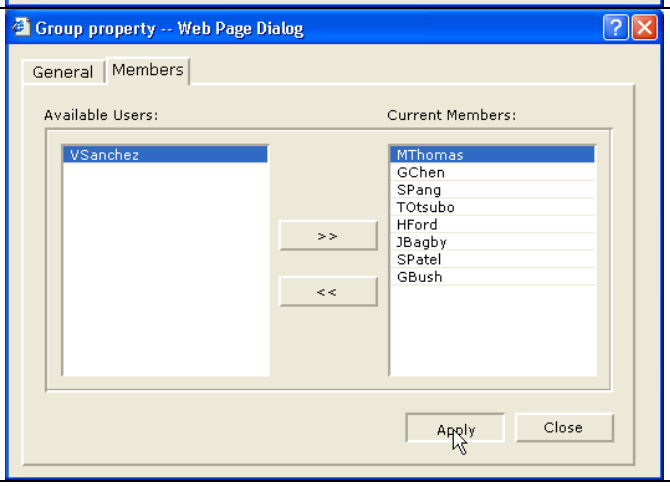
| Step | Description |
|---|---|

| Step | Description |
|---|---|
| 1 |  |
| 2 |  |
| 3 |  |

## Editing a Group

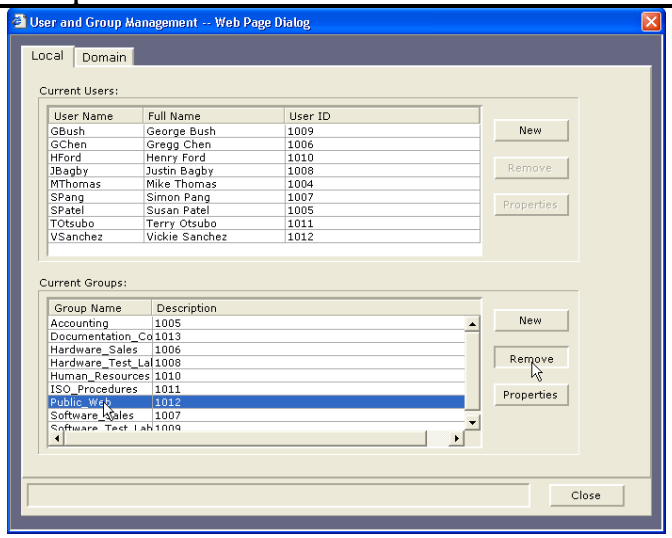
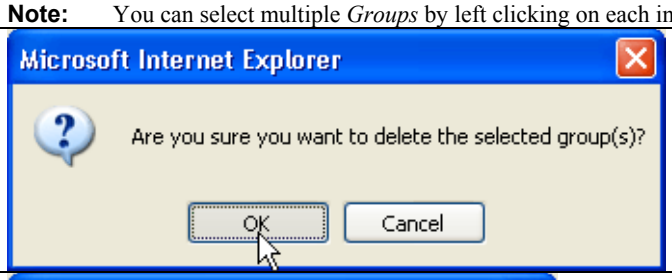
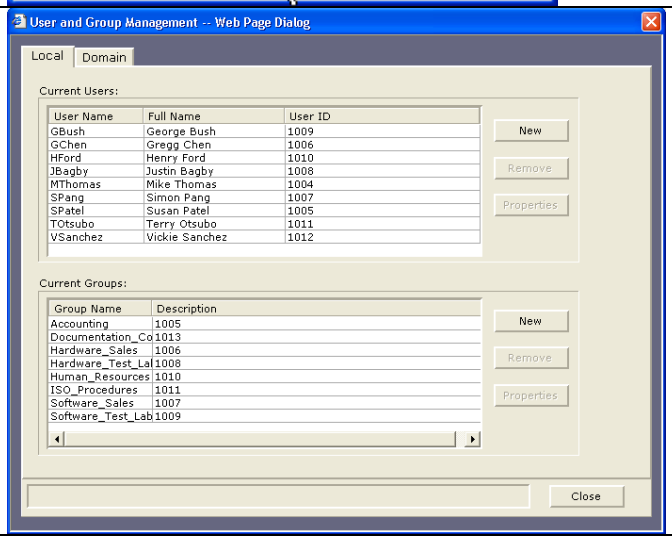
| Step | Description |
|---|---|

| Step | Description |
|---|---|
| 1 |  |
| 2 |  |
| 3 |  |

| Step | Description |
|---|---|
| 4 |  |
| 5 |  |
| 6 |  |

## Deleting a Group

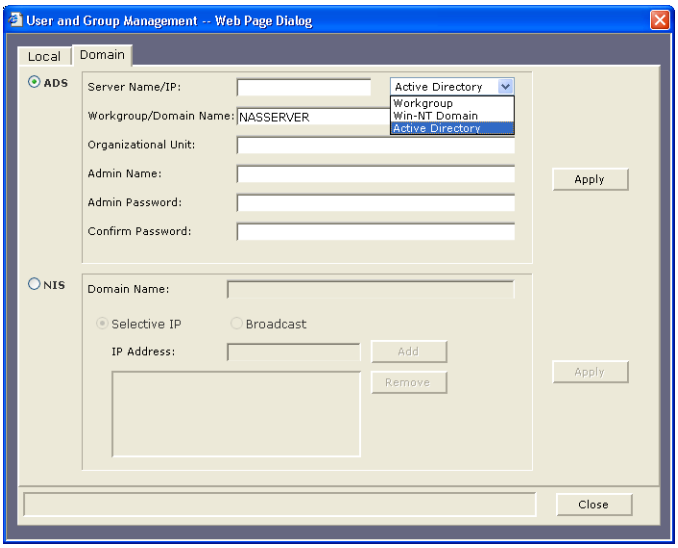
| Step | Description |
|---|---|

| Step | Description |
|---|---|
| 1 |  <br>**Note:** You can select multiple *Groups* by left clicking on each individual *Group*. |
| 2 |  |
| 3 | |
| 4 |  |

### ADS (Active Directory™ Services) Domain

*Active Directory*™ presents organizations with a directory service designed for distributed computing environments. *Active Directory*™ allows organizations to centrally manage and share information on network resources and users while acting as the central authority for network security. In addition to providing comprehensive directory services to a Microsoft® Windows® environment, *Active Directory*™ is designed to be a consolidation point for isolating, migrating, centrally managing, and reducing the number of directories that companies require.

*Active Directory*™ is the integral directory service within the Microsoft® Windows® 2000 operating system. This service improves manageability, enables security and extends interoperability between Microsoft® Windows® 2000 and other operating systems.



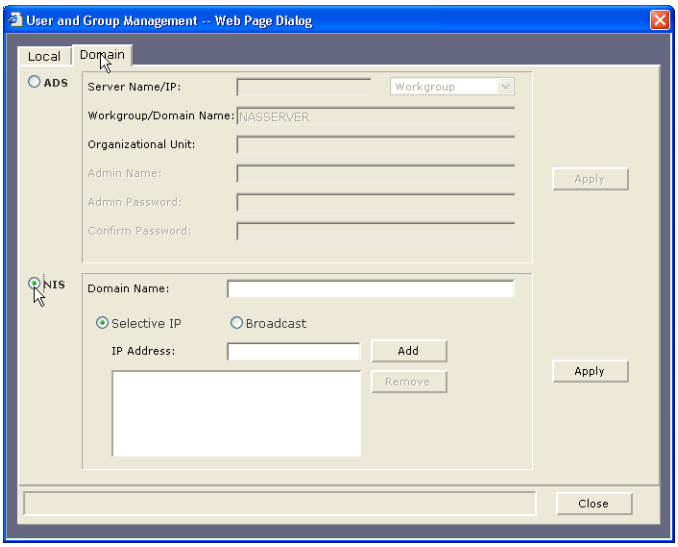

| Item | Description |
|---|---|
| Server Name/IP | |
| Workgroup/Domain Name | |
| Organizational Unit | |
| Admin Name | |
| Admin Password | |
| Confirm Password | |
| Apply Button | |

### NIS (Network Information System) Domain

Network Information System. Developed by Sun™ Microsystems, NIS is a distributed naming and directory service originally called Yellow Pages™ or YP. It is a mechanism for identifying and locating network objects and resources. It provides a uniform storage and retrieval method for network-wide information in a transport-protocol and media-independent fashion.

NIS is a network naming and administration system typically used for smaller networks. Using NIS, each host, client or server in the system has knowledge about the entire system. A user at any host can get access to files or applications on any host in the network with a single user identification and password. It is intended for use on local

area networks. NIS uses the client/server model and the Remote Procedure Call (RPC) interface for communication between hosts. NIS consists of a server, a library of client programs, and some administrative tools. NIS is often used with the Network File System (NFS). NIS is a UNIX® system-based application.



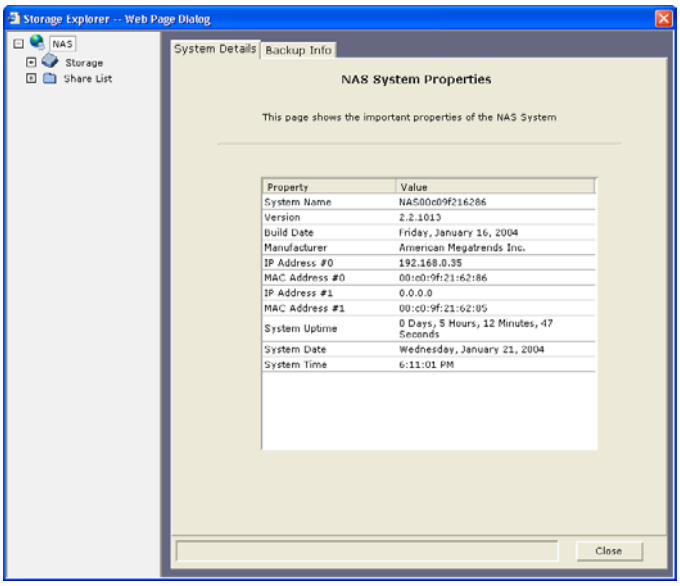

| Item | Description |
|---|---|
| Domain Name | |
| Selective IP | |
| Broadcast | |
| IP Address | |
| IP Address List | |
| Add Button | |
| Remove Button | |
| Apply Button | |

## Storage Explorer

This section allows you to do the following:

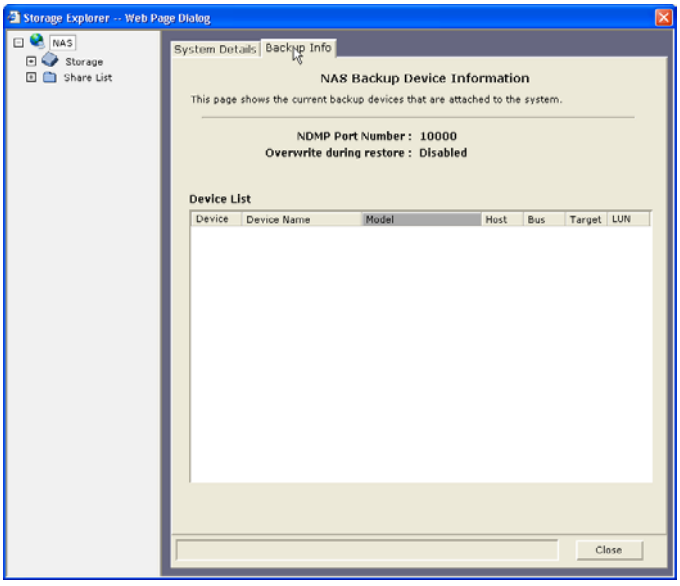
- view the properties of the NAS server.
- view backup devices that are attached to the NAS server.
- view and manage Volumes.
- view and manage shares.

### Viewing System Details



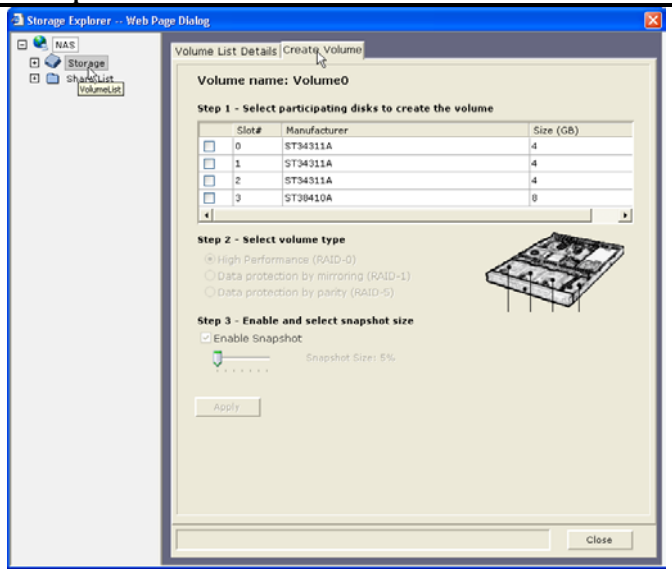

| Item | Description |
|---|---|
| System Name | This field displays the host name of the NAS server. The host name defaults to the letters **NAS** plus the MAC address of NIC-0. See the *System* section in *Chapter Three, Configuring Your NAS Server* for more information. |
| Version | This field displays the version of the NAS software. |
| Build Date | This field displays the build date of the NAS software. |
| Manufacturer | This field lets you know which company supplied the NAS software. |
| IP Address #0 and #1 | This field displays the IP address of the network interface card. |
| MAC Address #0 and #1 | This field displays the MAC address of the network interface card. |
| System Uptime | This field displays the amount of time that the NAS server has been consecutively running. Any warm boots or cold boots can cause the *Server Uptime* to be reset. |
| System Date | This field displays the date time on the NAS server. |
| System Time | This field displays the current time on the NAS server. |

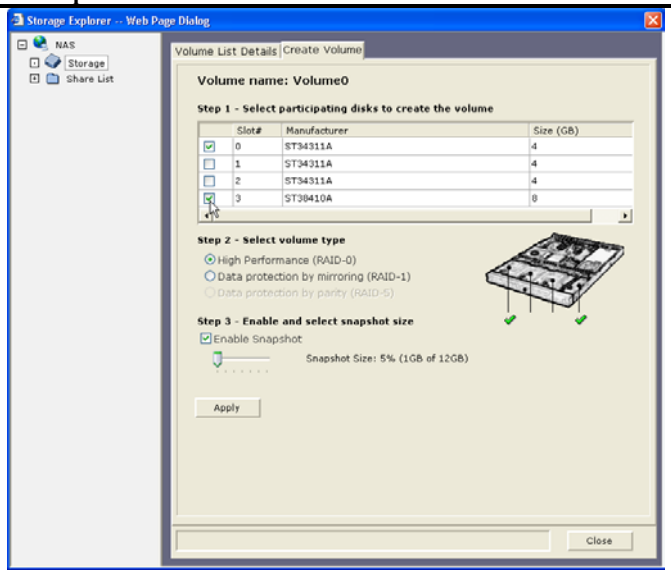
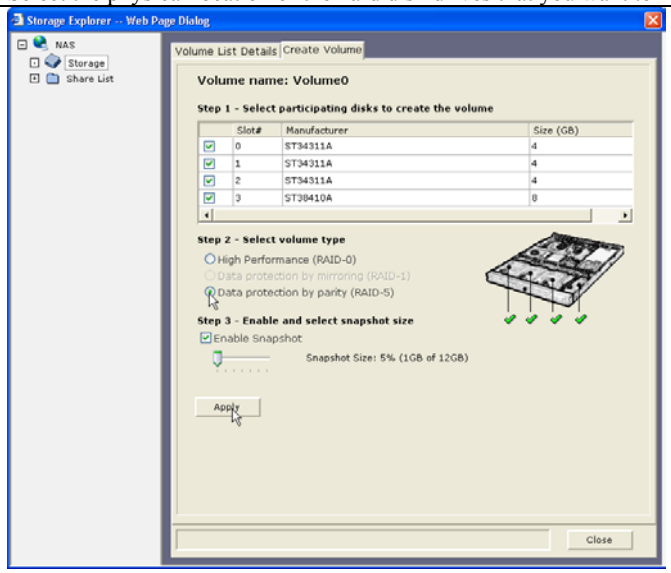
## Viewing Backup Information

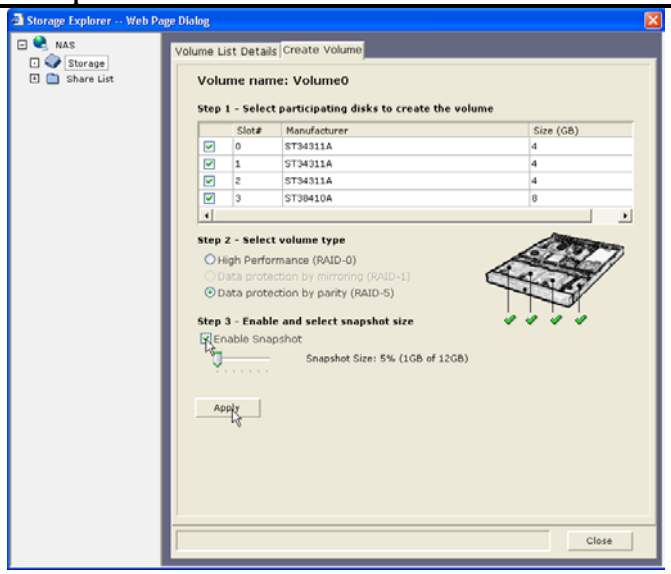
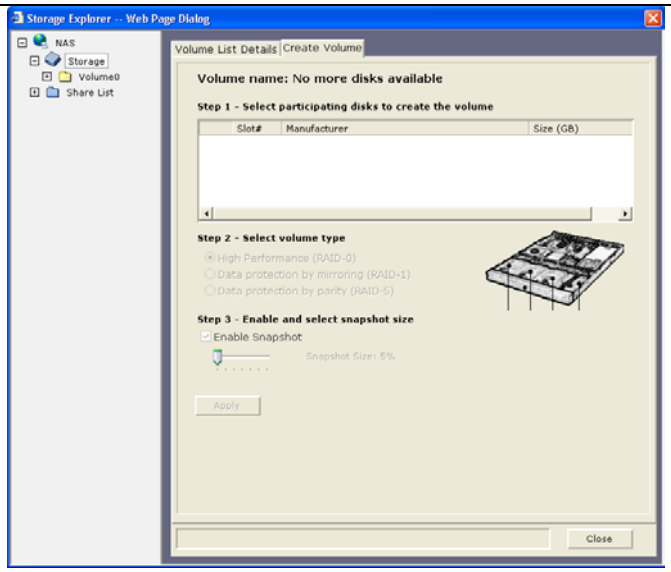


| Item | Description |
|---|---|
| NDMP Port Number | NDMP (Network Data Management Protocol): is the industry standard network based tape backup protocol. The data can be backed up and restored using any NDMP compatible backup software. This field displays the NDMP server port used for backup.<br><br>**Note:** Incremental backup is supported. |
| Overwrite During Restore | This field displays information regarding whether or not existing files are overwritten. At the time of the StorTrends NAS software release, this field cannot be changed. Instead, during a restore procedure, files are not overwritten. |
| Device List | Device:<br>Device Name:<br>Model:<br>Host:<br>Bus:<br>Target:<br>LUN: |

## Creating a Volume

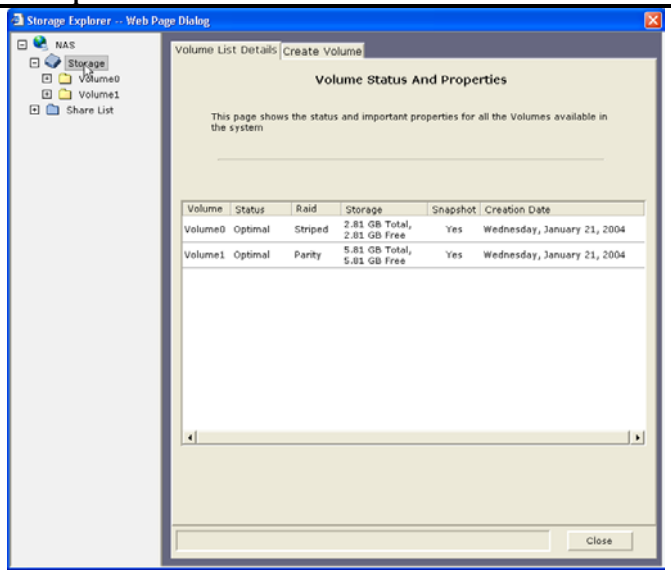
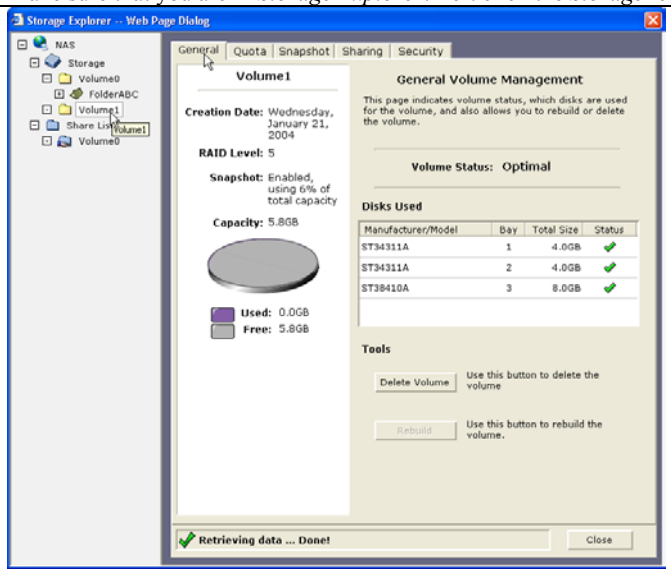
| Step | Description |
|---|---|
| 1 |  <br><br>A *Volume* is a fixed amount of storage. One *Volume* can span over more than one physical hard disk drive. It all depends on how you set up your *Volumes*.<br><br>Make sure that you are in *Storage Explorer*. Left click the *Storage* icon and then left click the *Create Volume* tab. |

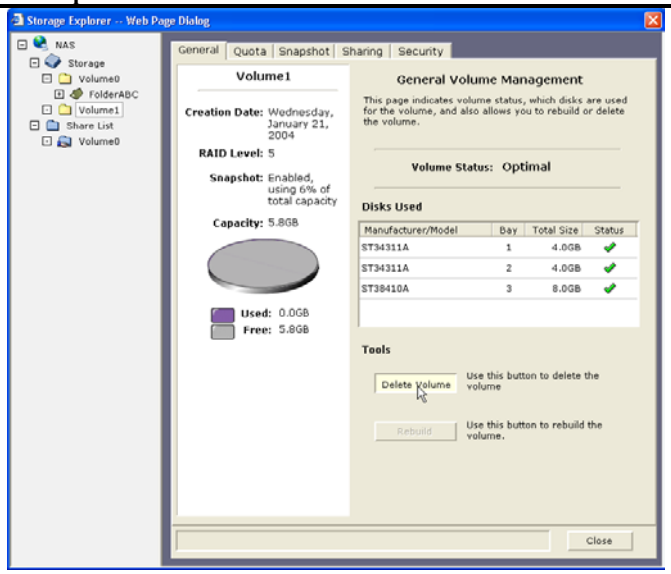
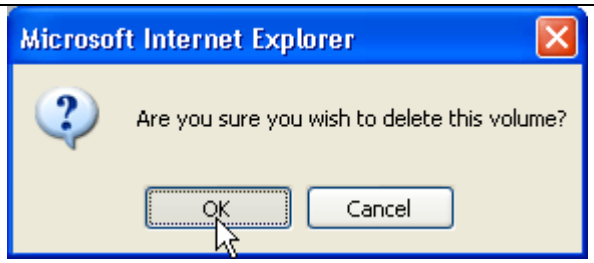
| Step | Description |
|---|---|
| 2 |  <br>Select the physical location of the hard disk drives that you want to include in your *Volume*. |
| 3 |  <br>Select the RAID level you want to use on your new *Volume*. See *Appendix C, RAID* for more information on the benefits of each of the supported RAID configurations.<br><br>**Note:** Depending on the number of hard disk drives that you select, certain RAID levels will be grayed out while other RAID levels are made available. |

| Step | Description |
|---|---|
| 4 |  <br>If you want to enable *Snapshots* on your *Volume*, left click the box next to *Enable Snapshot*. Left click the *Apply* button to continue and build the *Volume*.<br><br>**Note:** Depending on the RAID levels that you are going to use in for your *Volume*, the time it takes to build the *Volume* can vary. RAID level 5 Volumes typically take longer to build than a RAID level 0 Volume. |
| 5 |  <br>Congratulations! You have successfully created a *Volume*. The new *Volume* is now listed under the *Storage* icon in the *Storage Explorer* menu. If you did not use all the available hard disk drives for your *Volume*, the remaining hard disk drives are listed and made available for new *Volumes*. If no hard disk drives are available, no hard disk drives are listed. |

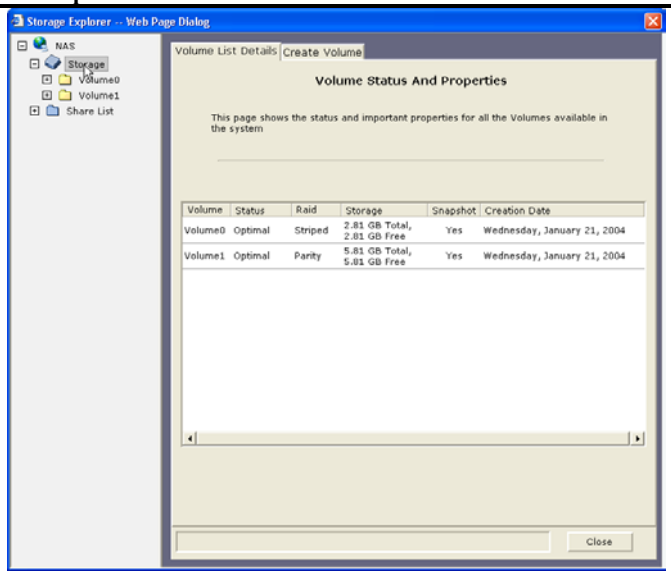
## Deleting a Volume

| Step | Description |
|---|---|

| Step | Description |
|---|---|
| 1 |  <br>Make sure that you are in *Storage Explorer*. Left click the *Storage* icon to view the *Volume List Details*. |
| 2 |  <br>Left click on the *Volume* that you want to delete. |

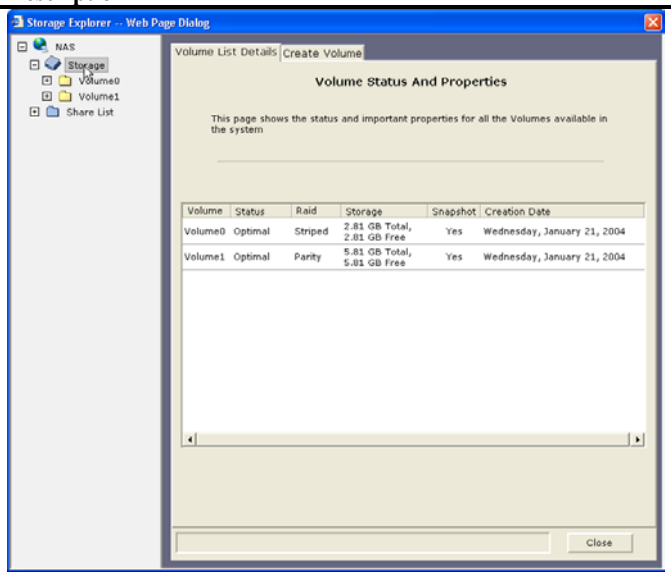
| Step | Description |
|---|---|
| 3 |  <br>Left click the *Delete Volume* button. |
| 4 |  <br>A confirmation dialog box opens. Left click the *OK* button to confirm. |

## Rebuilding a Volume

| Step | Description |
|---|---|
| 1 |  <br>Make sure that you are in *Storage Explorer*. Left click the *Storage* icon to view the *Volume List Details*. |

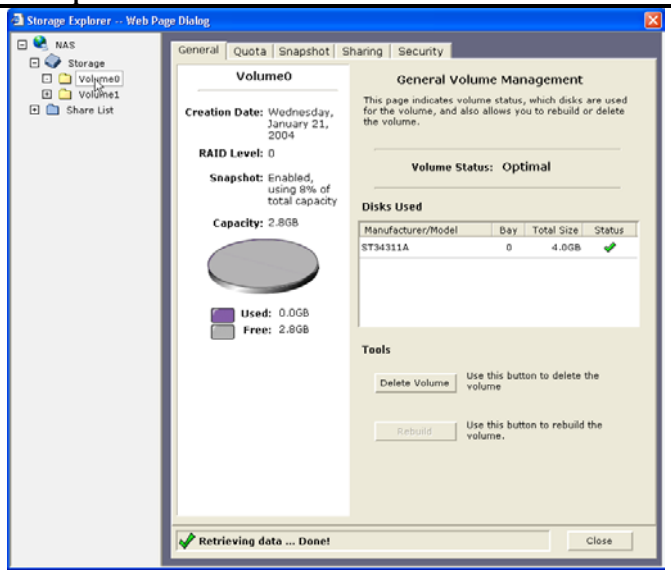
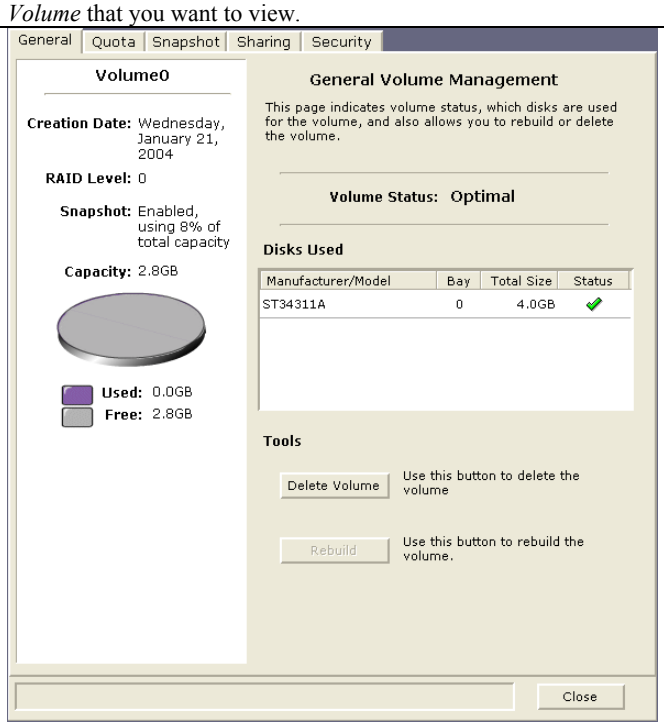
| Step | Description |
|---|---|
| 2 | Left click on the *Volume* that you want to rebuild. |
| 3 | Left click the *Rebuild* button. |
| 4 | A confirmation dialog box opens. Left click the *OK* button to confirm. |

### Viewing Volume List Details

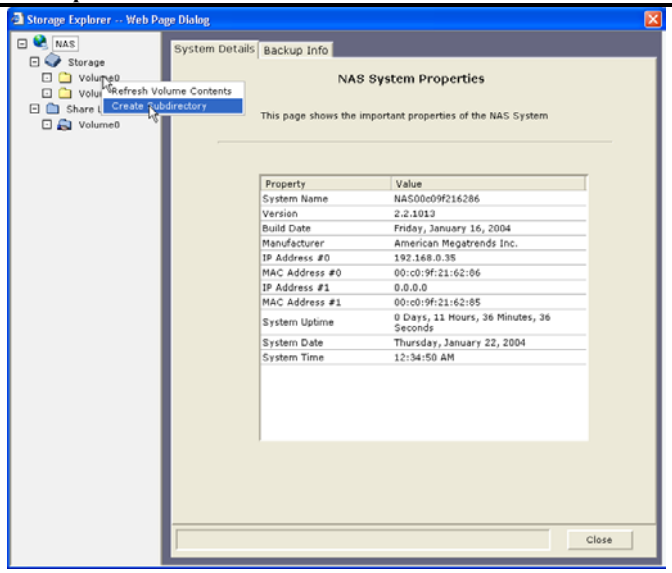
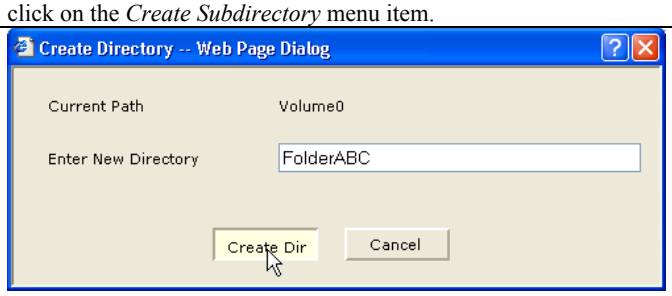
| Step | Description |
|---|---|
| 1 |  <br>Make sure that you are in *Storage Explorer*. Left click the *Storage* icon to view the *Volume List Details*.<br>**Note:** If you have just finished creating a *Volume*, you may have to left click the *Close* button and reopen *Storage Explorer*. |
| 2 | <br>Volume:<br>Status:<br>RAID:<br>Storage:<br>Snapshot:<br>Creation Date:<br><br>You can left click the *Close* button to exit the *Volume Status and Properties* window. |

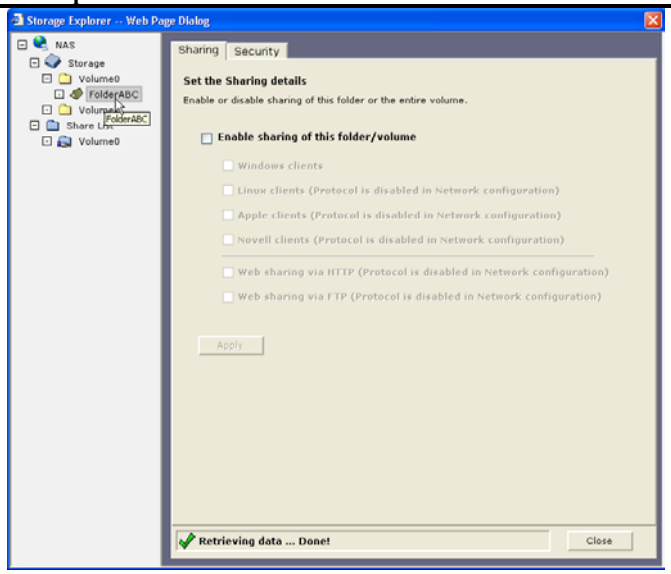
### Viewing Volume Properties

| Step | Description |
|---|---|

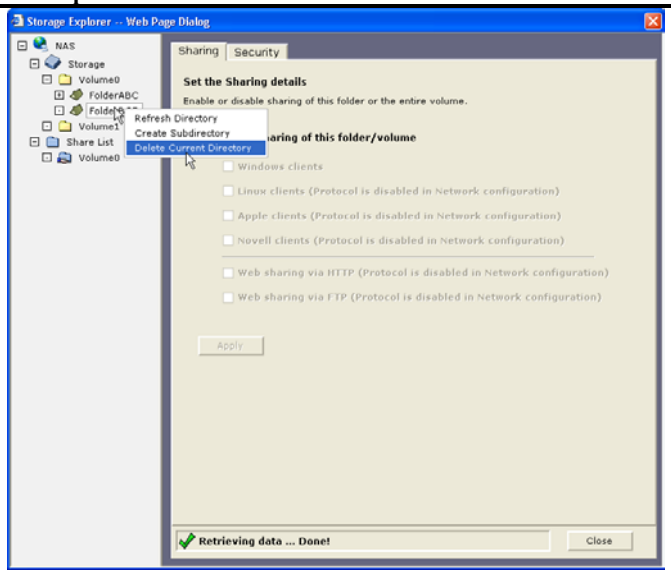
| Step | Description |
|---|---|
| 1 |  <br>Make sure that you are in *Storage Explorer*. Left click the *Storage* icon and then left click on the *Volume* that you want to view. |
| 2 |  <br>The General Volume Management window appears. It contains the following information:<br><br>Volume:<br>Status:<br>RAID:<br>Storage:<br>Snapshot:<br>Creation Date:<br>Disk Used:<br>Delete Volume Button:<br>Rebuild Volume Button: |

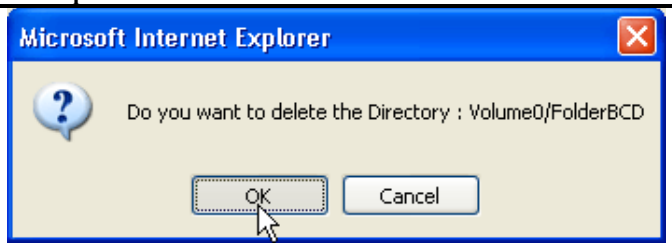
## Creating Subdirectories in Volumes

| Step | Description |
|---|---|
| 1 |  <br>Right click on the *Volume* that you want to create a subdirectory in. A dropdown menu appears. Left click on the *Create Subdirectory* menu item. |
| 2 |  <br>The *Create Directory* dialog box opens. Type the name that you want to use for the new directory in the *Enter New Directory* field. Left click the *Create Dir* button to create the directory in the selected *Volume*. |

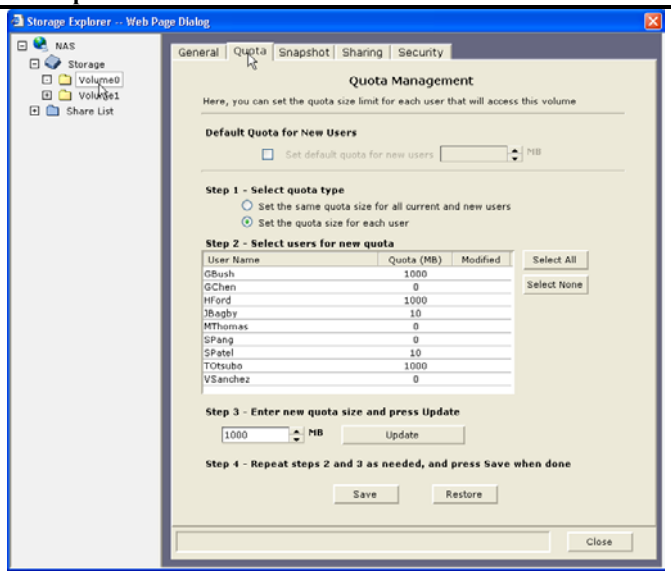
| Step | Description |
|---|---|
| 3 |  <br>The new subdirectory will appear under the *Volume* that it is in. You can left click on the new subdirectory to view its *Sharing* properties and *Security* settings.<br><br>**Note:** You can create new subdirectories inside subdirectories by simply right clicking on the subdirectory that you want to create a new subdirectory in. |

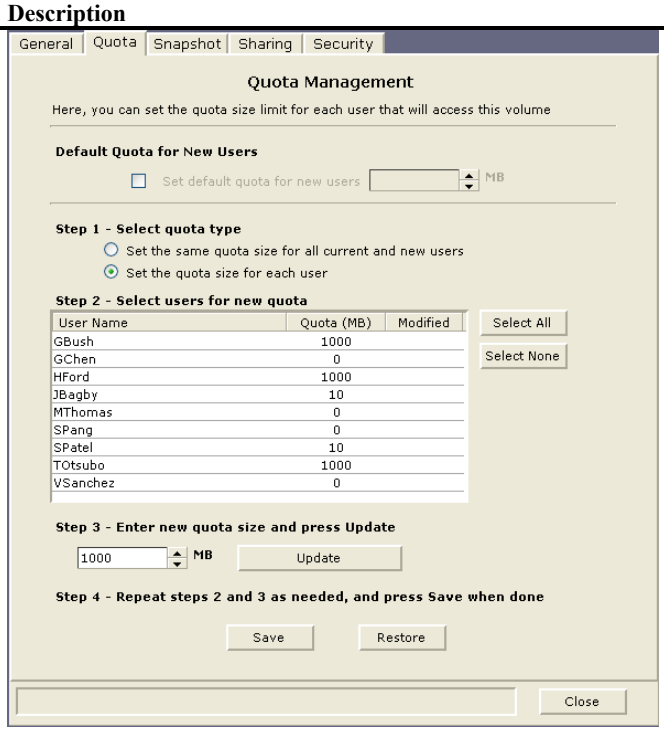
## Deleting Subdirectories in Volumes

| Step | Description |
|---|---|
| 1 |  <br>To delete a subdirectory, right click it and left click the *Delete Current Directory*. |

| Step | Description |
|---|---|
| 2 |  <br>A confirmation dialog box opens. Left click the *OK* button to confirm. |
| 3 | <br>A confirmation dialog box opens. Left click the *OK* button. |

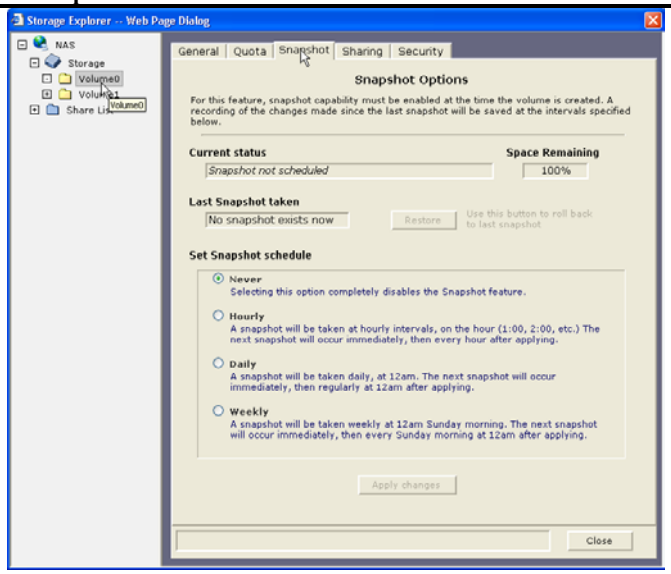
## Managing Quotas

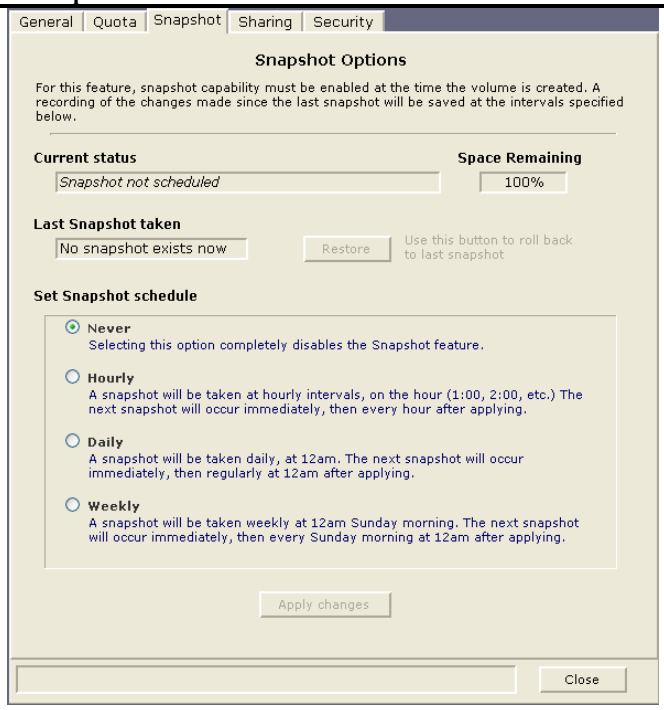
| Step | Description |
|---|---|
| 1 |  <br>A Quota is how much hard disk space a user can use. This is a useful tool that can help you plan your future storage growth. It can also force users to manage their usage and not waste NAS server space.<br><br>Make sure that you are in *Storage Explorer*. Left click the *Storage* icon and then left click on the *Volume* that you want to view. Left click on the *Quota* tab to start managing user *Quotas*. |

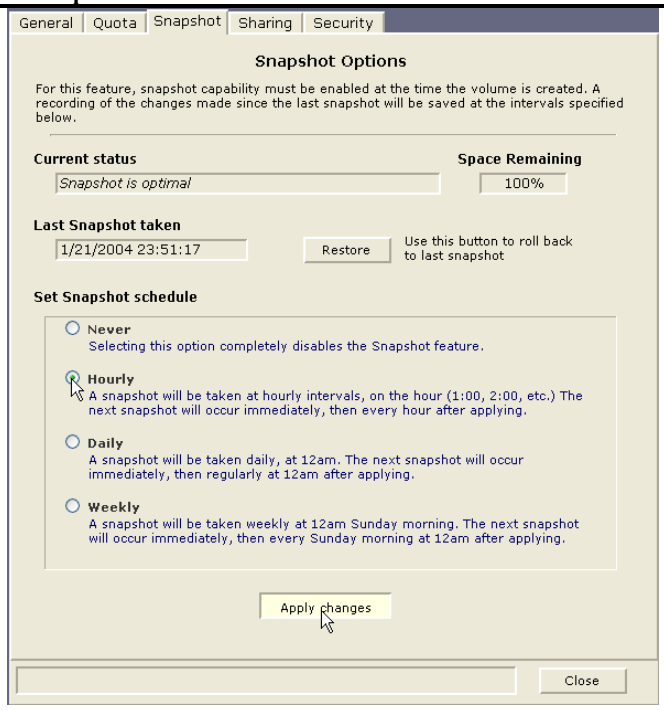
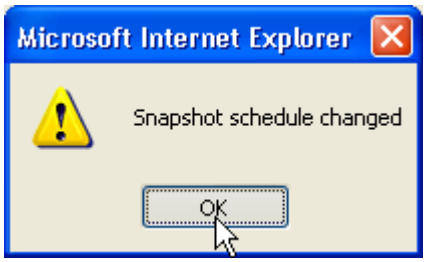
| Step | Description |
|---|---|
| 2 |  <br>You can set the *Default Quota for New Users* that you create by simply placing a check in the box under *Default Quota for New Users* and setting the amount of space you want to allow for each new user (in MB). |
| 3 | *Step 1 – Select Quota Type*: This step allows you to either setup quotas based on all the users or by individual users. Select how you want to manage quotas. If you select *Set the same quota size for all current and new users*, all the user names in *Step 2 – Select User for New Quota* will be highlighted. |
| 4 | *Step 2 – Select User for New Quota*: This step allows you to select individual users and set how much hard disk space they can use. |
| 5 | *Step 3 – Enter New Quota Size and Press Update*: This step allows you to enter the size of the space in MB. After you enter the desired amount, left click the *Update* button. |
| 6 | *Step 4 – Repeat steps 2 and 3 as needed and press Save When Done*: Left click the *Save* button to implement the modifications that you have made.<br><br>You can also cancel the changes that you have made by left clicking the *Restore* button.<br><br> <br>A confirmation dialog box opens. Left click the *OK* button to discard changes. |

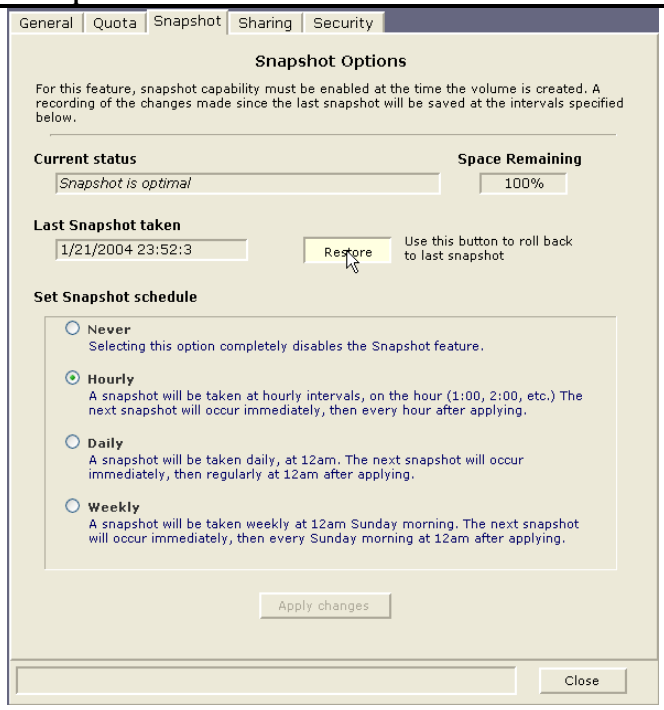
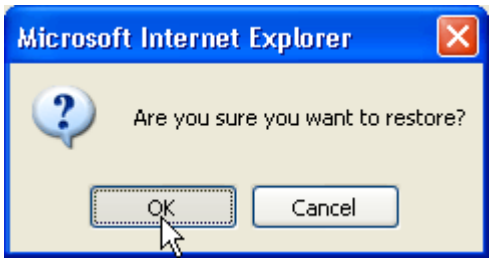
## Creating and Restoring Volume Level Snapshots

| Step | Description |
|---|---|

| Step | Description |
|---|---|
| 1 |  <br>This section allows you to record a *Volume* level *Snapshot* and restore from a *Snapshot* image. *Snapshot* of any *Volume* can be enabled at any time to restore back to that particular state in the future.<br><br>Make sure that you are in *Storage Explorer*. Left click the *Storage* icon and then left click on the *Volume* that you want to view. Left click on the *Snapshot* tab to start managing *Volume* level *Snapshots*.<br><br>**Note:** For *Snapshots* to work, you must have enabled *Snapshots* at the time the *Volume* was created. A recording of the changes made since the last *Snapshot* is saved at the intervals specified in this section. |

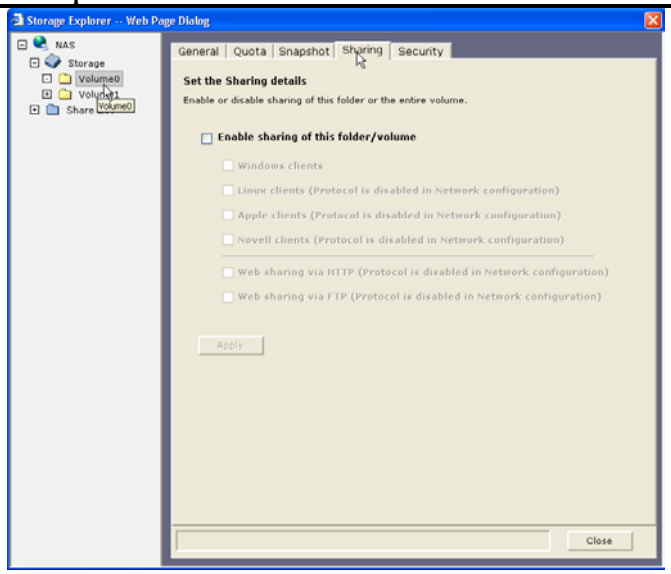
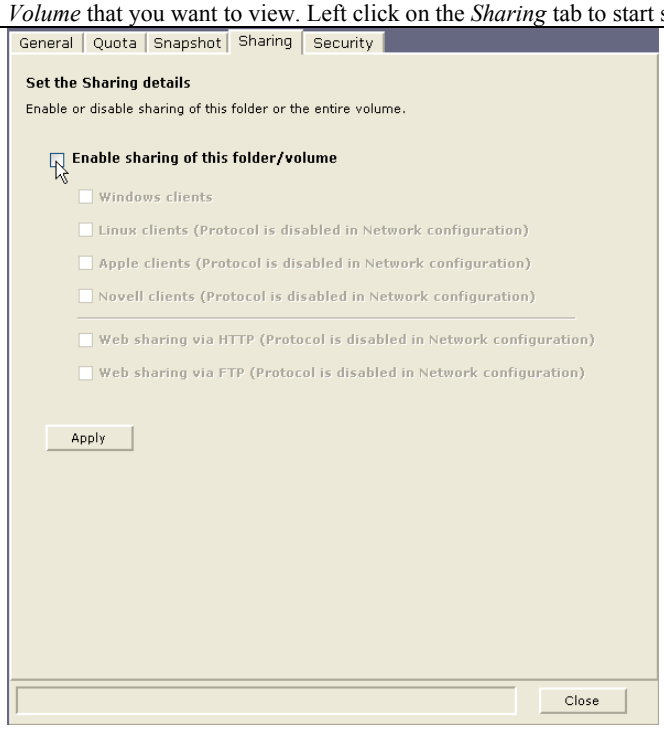
| Step | Description |
|---|---|
| 2 |  <br>*Current Status*: This field displays the status of the *Snapshot* on your NAS server.<br>*Space Remaining*: This field displays the remaining percentage of space available for the *Snapshot* image on your *Volume*.<br>*Last Snapshot Taken*: This field displays the time the last Snapshot was taken. It is displayed as MM/DD/YEAR HR:MN:S.<br>*Set Snapshot Schedule*: This section allows you to set the time intervals that you want the *Snapshots* to be taken. |

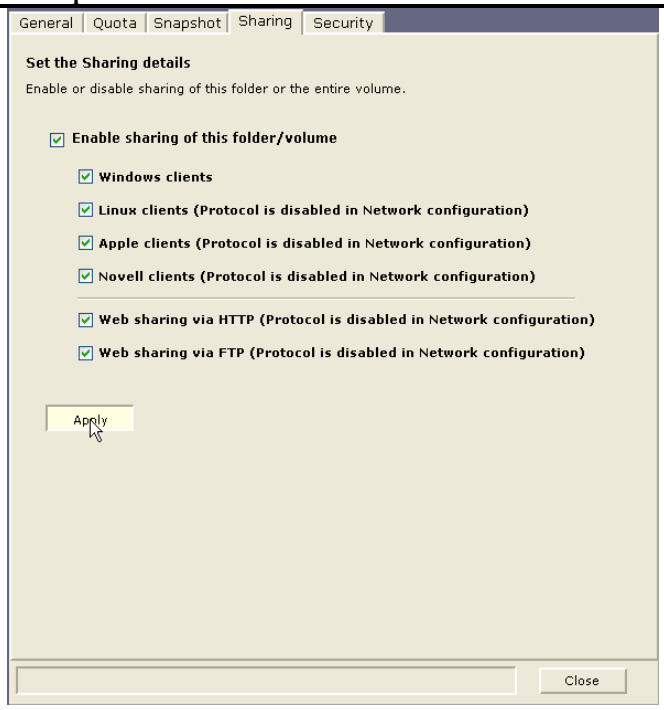
| Step | Description |
|---|---|
| 3 |  <br>To set the *Snapshot* schedule, left click the time interval desired. Each option is described under its corresponding time interval. By default *Snapshot Schedule* is set to *Never*.<br>  <br>A dialog box opens. Left click the *OK* button to confirm the *Snapshot* schedule change. |

| Step | Description |
|---|---|
| 4 |  <br>Left click the *Restore* button to immediately restore the *Volume* from the *Snapshot*. This rolls back the *Volume* image to a point when the last *Snapshot* was taken.<br>  <br>A dialog box opens. Left click the *OK* button to confirm that you want to restore from you last *Snapshot*.<br> <br>A dialog box opens. Left click the *OK* button to confirm the restoration. |

## Setting Sharing Protocols

| Step | Description |
|---|---|

| Step | Description |
|---|---|
| 1 |  <br>This section allows you to enable CIFS Shares for Microsoft® Windows® Clients, NFS Shares for UNIX® or Linux® Clients, AFP Shares for Apple® Clients, and NCP Shares for Novell® NetWare® Clients.<br><br>Make sure that you are in *Storage Explorer*. Left click the *Storage* icon and then left click on the *Volume* that you want to view. Left click on the *Sharing* tab to start setting Sharing protocols. |
| 2 |  <br>Left click the box next to *Enable Sharing of this Folder/Volume* to allow the *Volume* to be shared. |

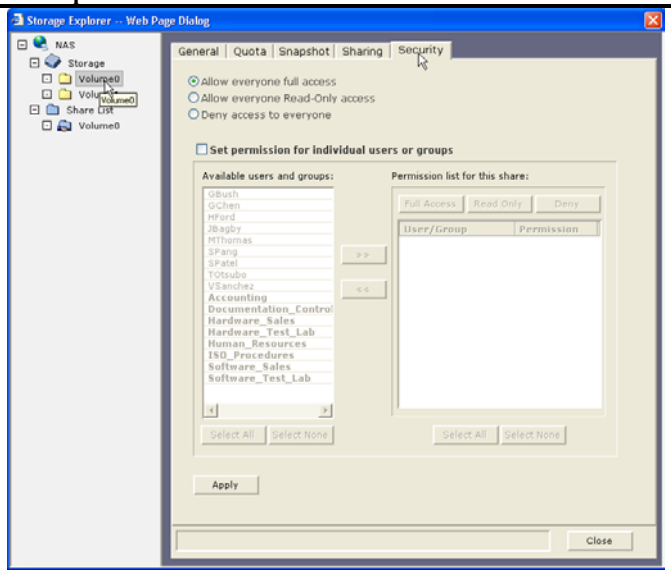
| Step | Description |
|---|---|
| 3 |  <br>Select the various protocols that you want to enable or disable. Left click the *Apply* button to make the changes active. |

## HTTP and FTP Considerations

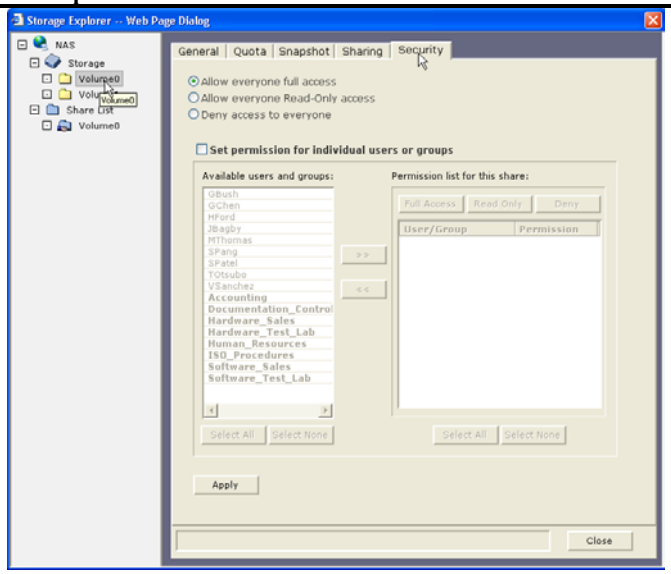
| Name | Description | Port |
|---|---|---|
| HTTP | If you have enabled *Web sharing via HTTP*, then *Users* can access the permitted share using a standard Internet browser. You can do this from the address field of your Internet browser. Use the following format:<br><br>**`http://<IP_address>:8080`**<br><br>For example, if your IP address is **`192.168.0.55`**, type the following:<br><br>**`http://192.168.0.55:8080`** | 8080 |
| FTP | If you have enabled *Web sharing via FTP*, then *Users* can access the permitted share using a standard Internet browser or *FTP* client program. You can do this from the address field of your Internet browser. Use the following format:<br><br>**`ftp://<IP_address>`**<br><br>For example, if your IP address is **`192.168.0.55`**, type the following:<br><br>**`ftp://192.168.0.55`**<br><br>You can also use an FTP client program. | 21 |

## Setting Full Volume Access Rights

| Step | Description |
|---|---|

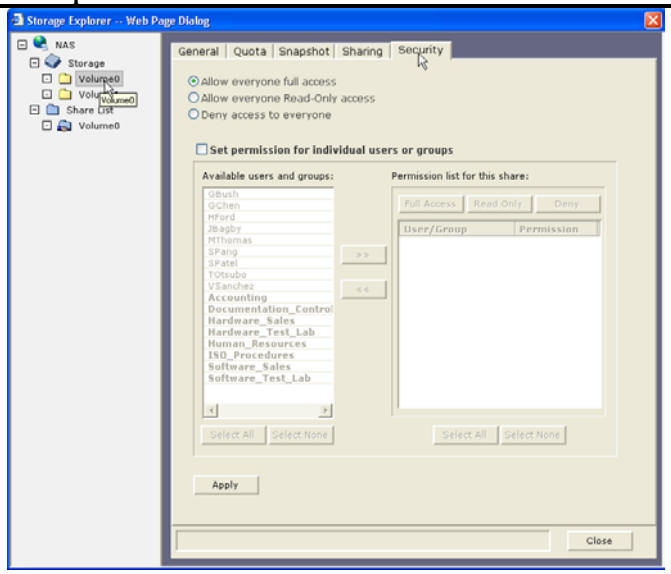
| Step | Description |
|---|---|
| 1 |  <br>Make sure that you are in *Storage Explorer*. Left click the *Storage* icon and then left click on the *Volume* that you want to view. Left click on the *Security* tab to start managing the *Security* settings. |
| 2 | By default the *Allow everyone full access* is selected. If it is not, select the *Allow everyone full access*. Left click the *Apply* button to implement the change. |

### Setting Read Only Volume Access to Everyone

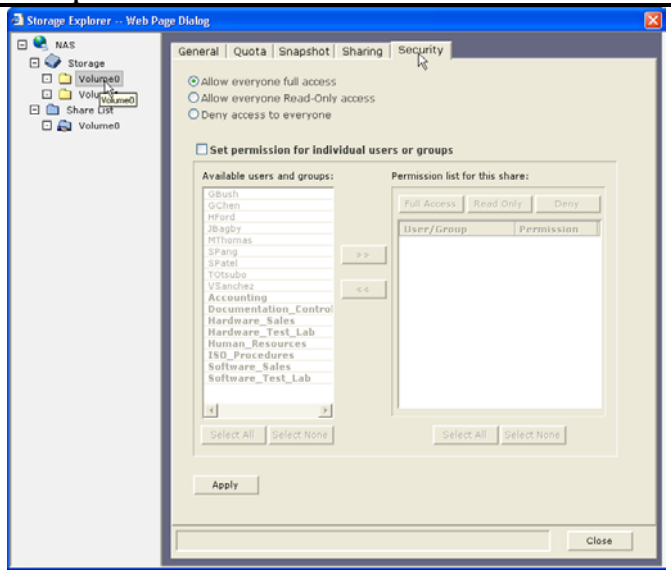
| Step | Description |
|---|---|
| 1 |  <br>Make sure that you are in *Storage Explorer*. Left click the *Storage* icon and then left click on the *Volume* that you want to view. Left click on the *Security* tab to start managing the *Security* settings. |
| 2 | Select the *Allow everyone Read-Only access*. Left click the *Apply* button to implement the change. |

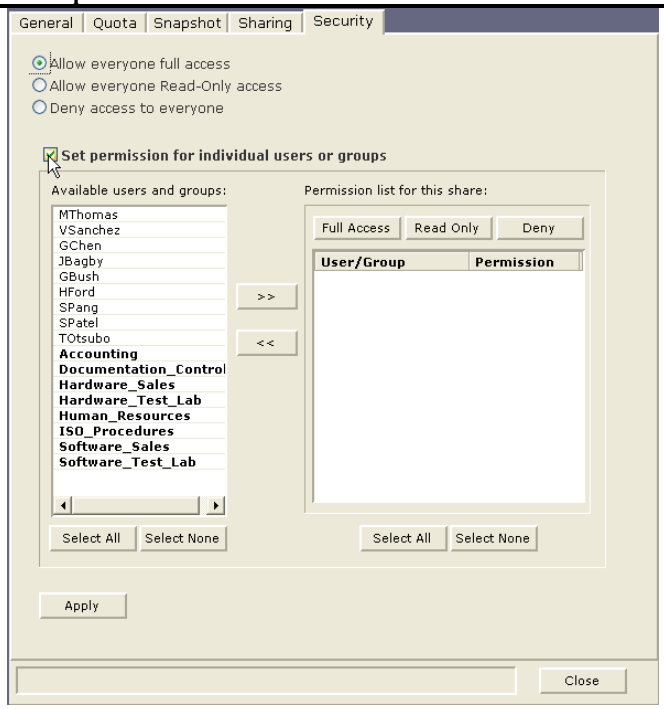
### Denying Volume Access Rights

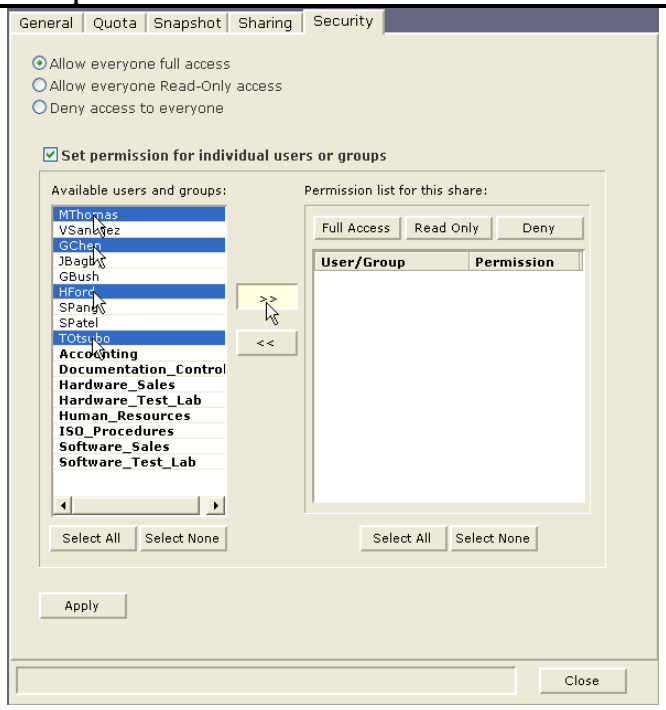
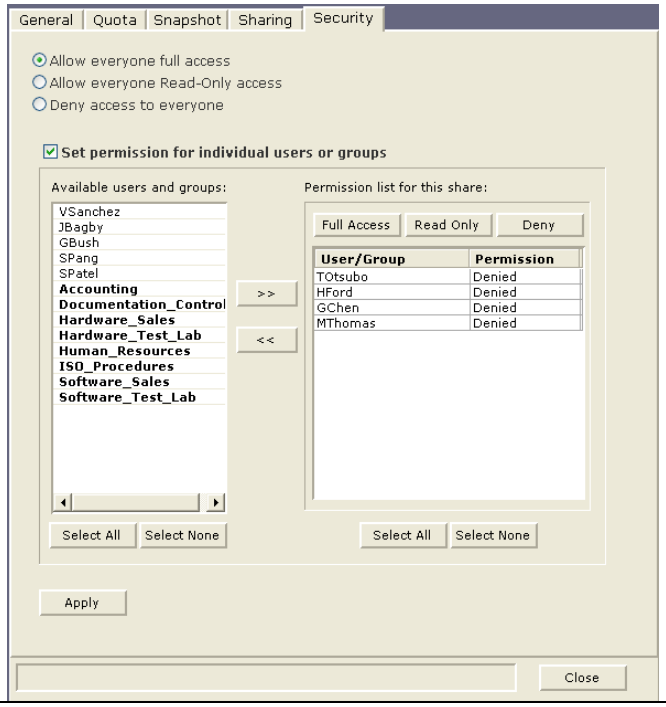
| Step | Description |
|---|---|

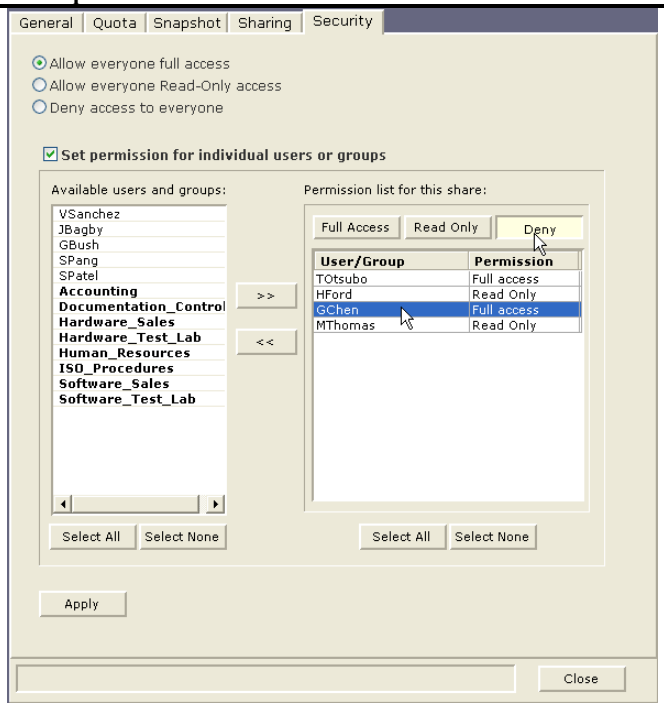
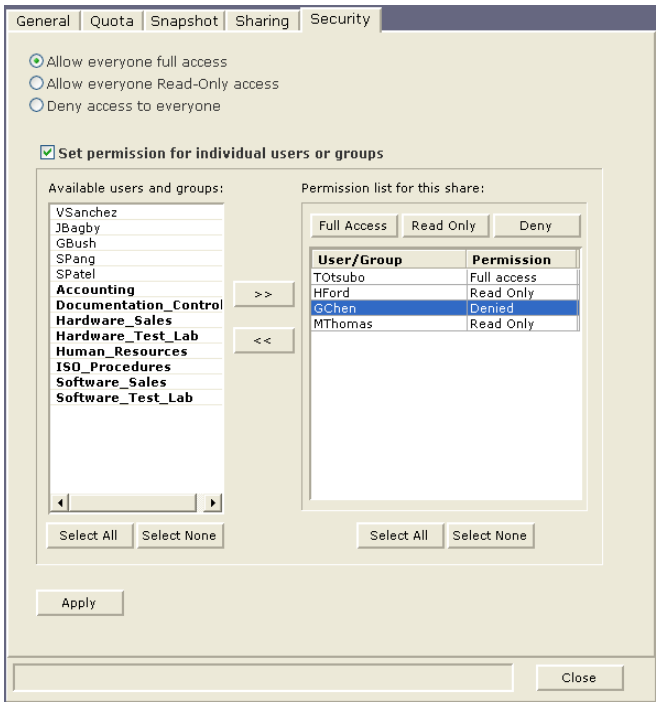
| Step | Description |
|---|---|
| 1 |  <br>Make sure that you are in *Storage Explorer*. Left click the *Storage* icon and then left click on the *Volume* that you want to view. Left click on the *Security* tab to start managing the *Security* settings. |
| 2 | Select the *Deny access to everyone*. Left click the *Apply* button to implement the change. |

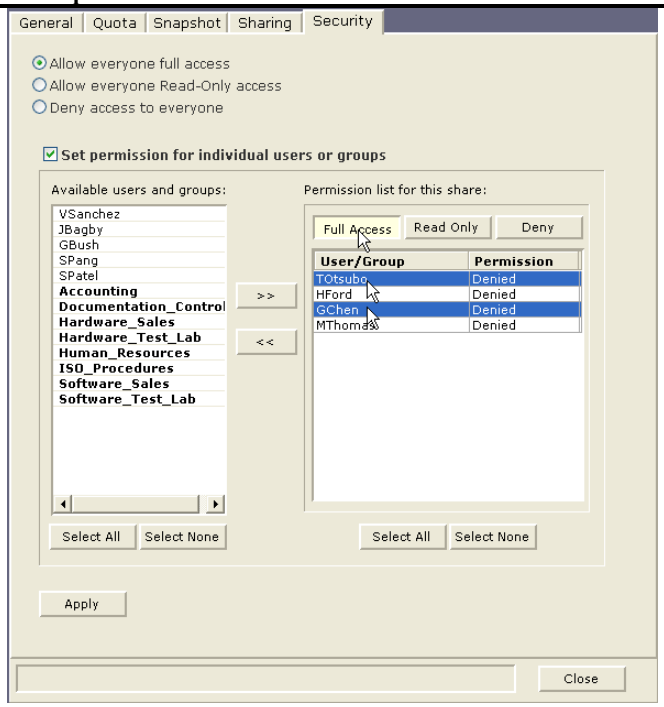
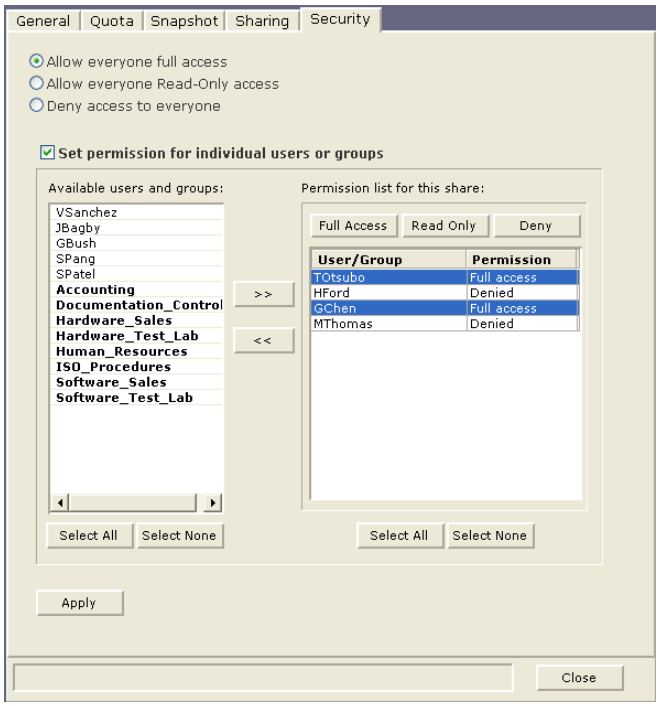
## Setting Individual User and Group Volume Access Rights

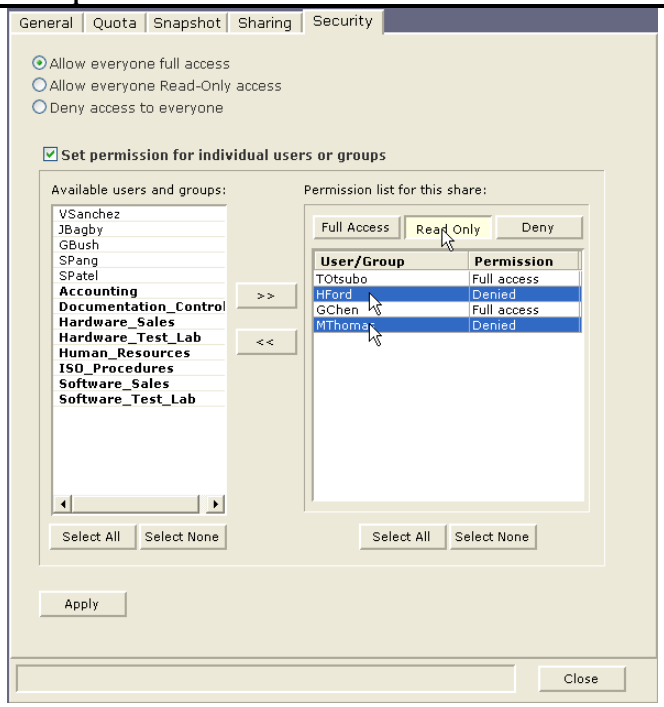
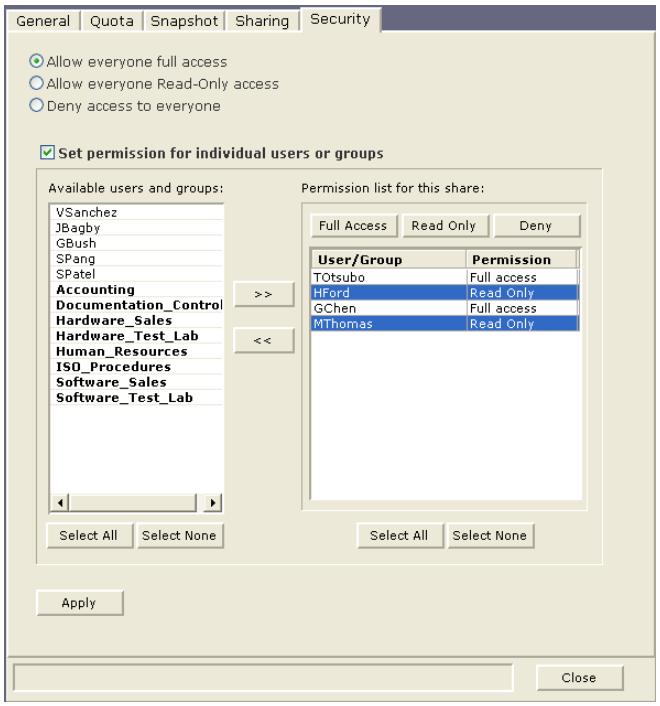
| Step | Description |
|---|---|
| 1 |  <br>Make sure that you are in *Storage Explorer*. Left click the *Storage* icon and then left click on the *Volume* that you want to view. Left click on the *Security* tab to start managing the *Security* settings. |

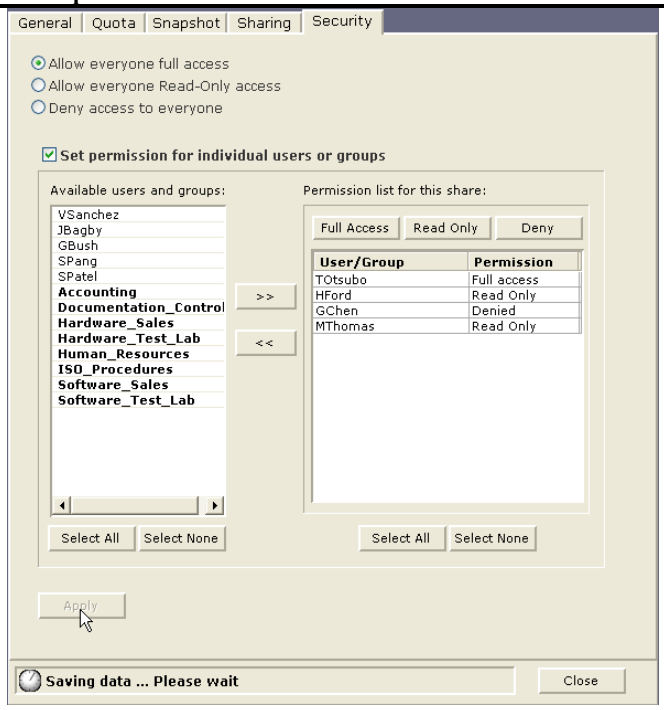
| Step | Description |
|---|---|
| 2 |  <br>Left click the box next to *Set permissions for individual users or groups* to set individual user or group access rights. |

| Step | Description |
|---|---|
| 3 |  <br>Highlight the users or groups that you want to set permissions for individually by left clicking on the user name or group name. Left click the >> button to move the users or groups to the *Permission List For this Share* field so that you can view and edit their access rights.<br>**Note:** You can use the *Select All* button to highlight the entire list. Likewise, you can use the *Select None* button to deselect the entire list. This is a very useful tool when you have a long list of users and groups.<br>  |

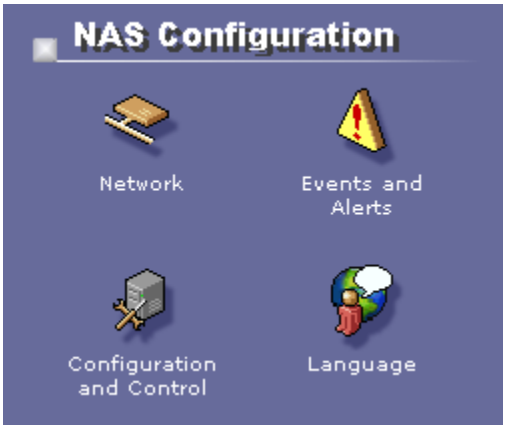
| Step | Description |
|---|---|
| 4 |  <br>Highlight the users or groups that you want to *Deny* access rights for and left click the *Deny* button. This is the default setting.<br>**Note:** You can use the *Select All* button to highlight the entire list. Likewise, you can use the *Select None* button to deselect the entire list. This is a very useful tool when you have a long list of users and groups.<br>  <br>*Denied* is now listed in the *Permission* field next to the user or group. |

| Step | Description |
|---|---|
| 5 |  <br>Highlight the users or groups that you want to set *Full Access* rights for and left click the *Full Access* button.<br>**Note:** You can use the *Select All* button to highlight the entire list. Likewise, you can use the *Select None* button to deselect the entire list. This is a very useful tool when you have a long list of users and groups.<br>  <br>*Full Access* is now listed in the *Permission* field next to the user or group. |

| Step | Description |
|---|---|
| 6 |  <br>Highlight the users or groups that you want to set *Read Only* access rights for and left click the *Read Only* button.<br>**Note:** You can use the *Select All* button to highlight the entire list. Likewise, you can use the *Select None* button to deselect the entire list. This is a very useful tool when you have a long list of users and groups.<br>  <br>*Read Only* is now listed in the *Permission* field next to the user or group. |

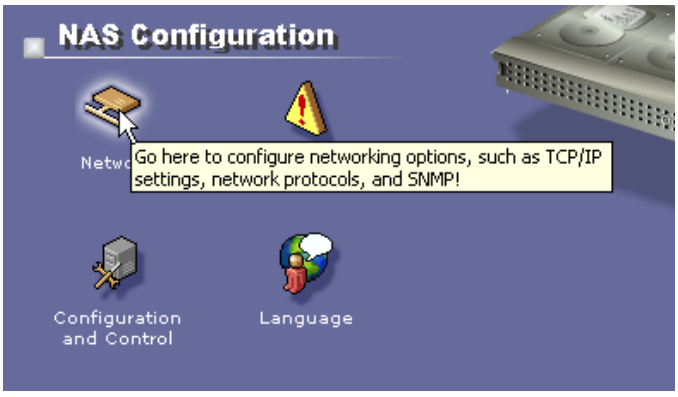
| Step | Description |
|---|---|
| 7 |  <br>Left click the *Apply* button to implement the change. |

## NAS Configuration Section



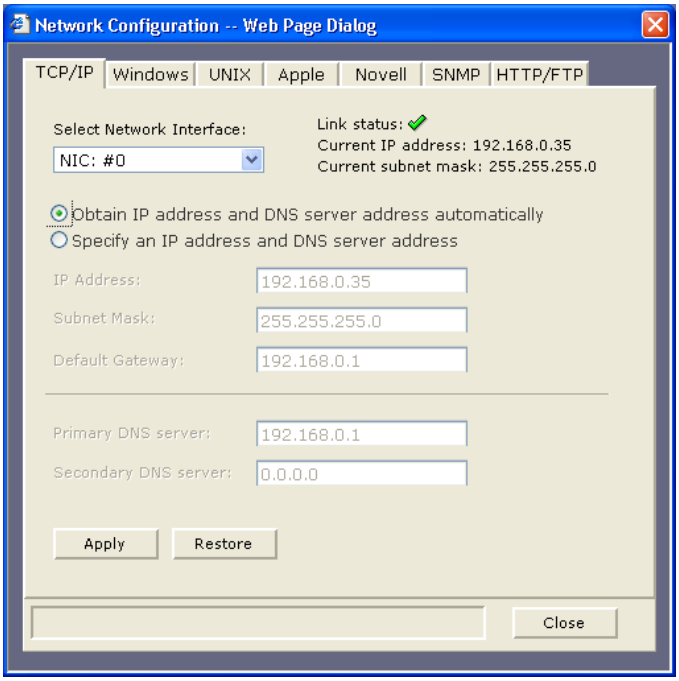

| Name | Icon | Description |
|---|---|---|
| Network | | This section contains a subsection for each supported networking protocol. The following protocols are supported: TCP/IP, AppleTalk®, SNMP, NIS, and IPX. |
| Events and Alerts | | This section allows you to do the following:<br>● view all event log messages stored on your NAS server. There is no specified limit for the amount of log entries that your NAS server can store.<br>● set a remote mail server (SMTP) and up to four administrative email addresses to be notified of alert conditions.<br>● enable SNMP traps. This is used to send alert notifications, known as SNMP traps, to remote management servers. |
| Configuration and Control | | This section allows you to do the following:<br>● shutdown or restart the NAS server.<br>● change the system name of your NAS server.<br>● change the root password.<br>● upgrade the firmware.<br>● adjust the date and time. |
| Language | | This section allows you to change the language of your NAS software. The default language is *English*. |

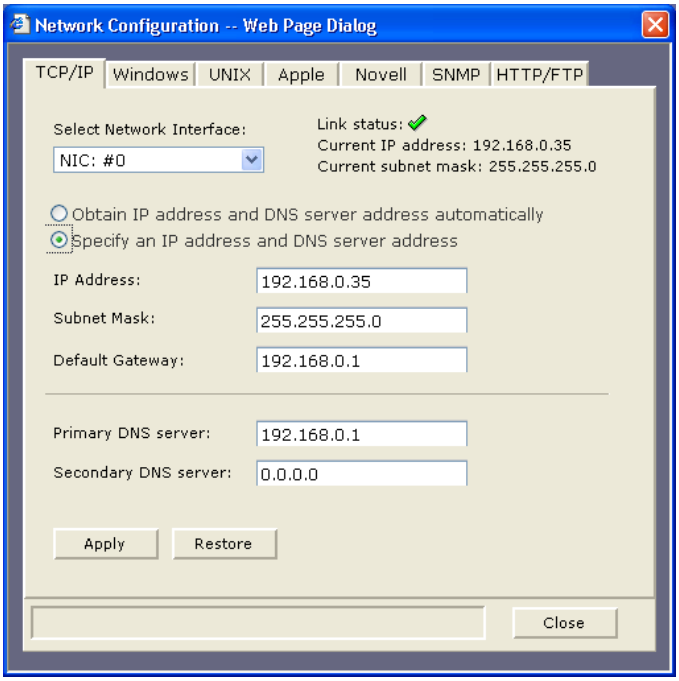
## Network


NAS Configuration
Netwo
Go here to configure networking options, such as TCP/IP settings, network protocols, and SNMP!
Configuration and Control
Language

This section contains a subsection for each supported networking protocol. The following protocols are supported: TCP/IP, AppleTalk®, SNMP, NIS, and IPX.

## TCP/IP Tab

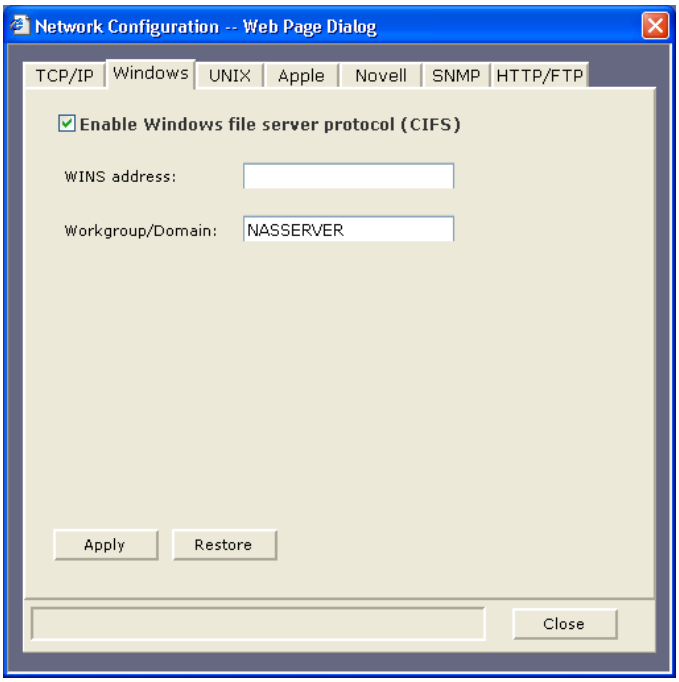



| Item | Description |
|---|---|
| Select Network Interface dropdown menu | |
| Obtain IP Address and DNS Server Address Automatically | |

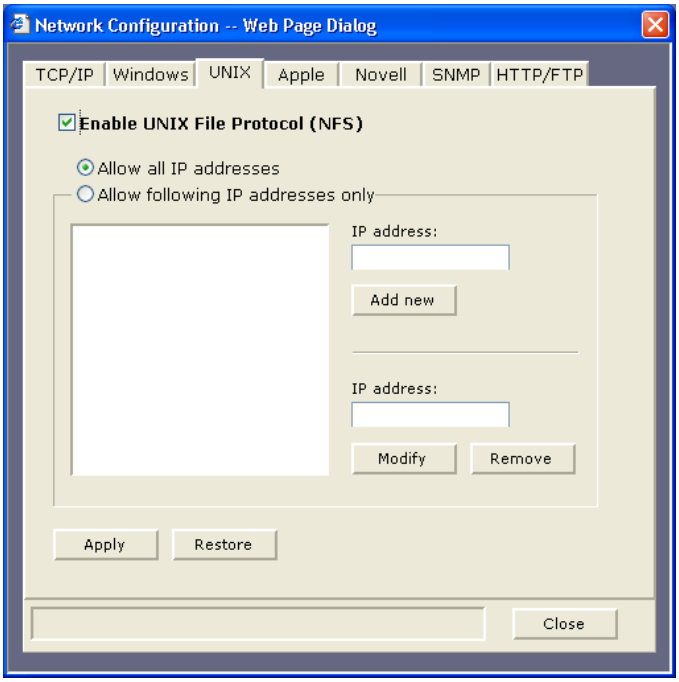
| Item | Description |
|---|---|
| Specify an IP Address and DNS Server Address | |
| IP Address | |
| Subnet Mask | |
| Default Gateway | |
| Primary DNS Server | |
| Secondary DNS Server | |
| Apply button | |
| Restore button | |

### Windows Tab




| Item | Description |
|---|---|
| Enable Windows File Server Protocol (CIFS) | |
| WINS Address | |
| Workgroup/Domain | |
| Apply button | |
| Restore button | |

### UNIX Tab

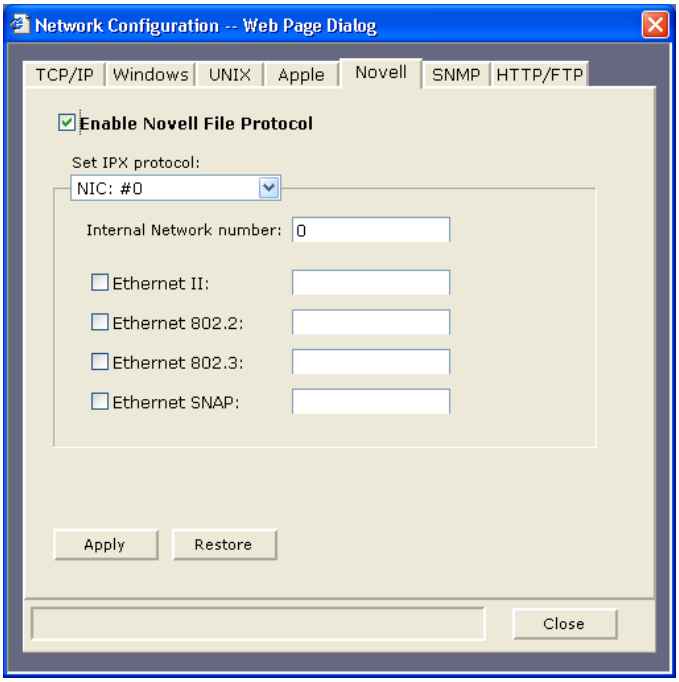



| Item | Description |
|---|---|
| Enable UNIX File Protocol (NFS) | |
| Allow All IP Addresses | |
| Allow Following IP Addresses Only | |
| Allow Following IP Addresses Only field | |
| IP Address | |
| Add New button | |
| IP Address | |
| Modify button | |
| Remove button | |
| Apply button | |
| Restore button | |

## Apple Tab

| Item | Description |
|---|---|
| Enable Apple File Protocol (AFP) | |
| Apply button | |

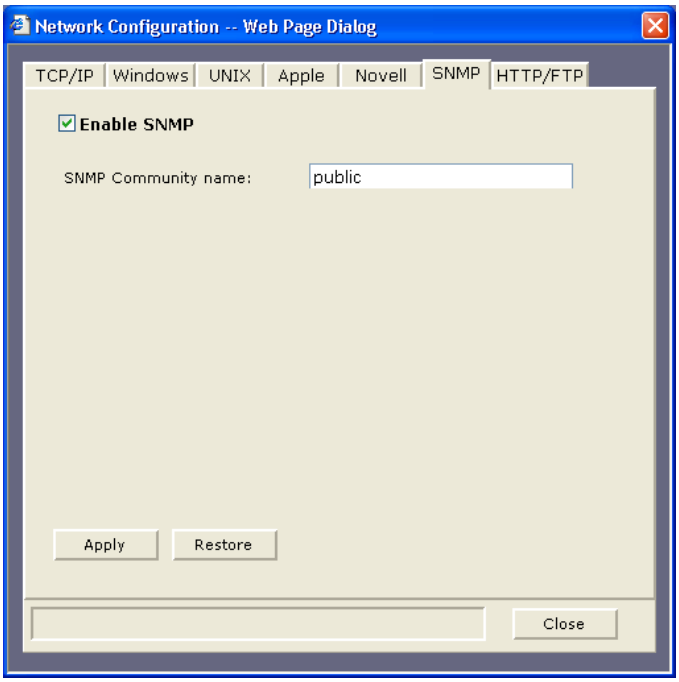
## Novell Tab




| Item | Description |
|---|---|
| Enable Novell File Protocol | |

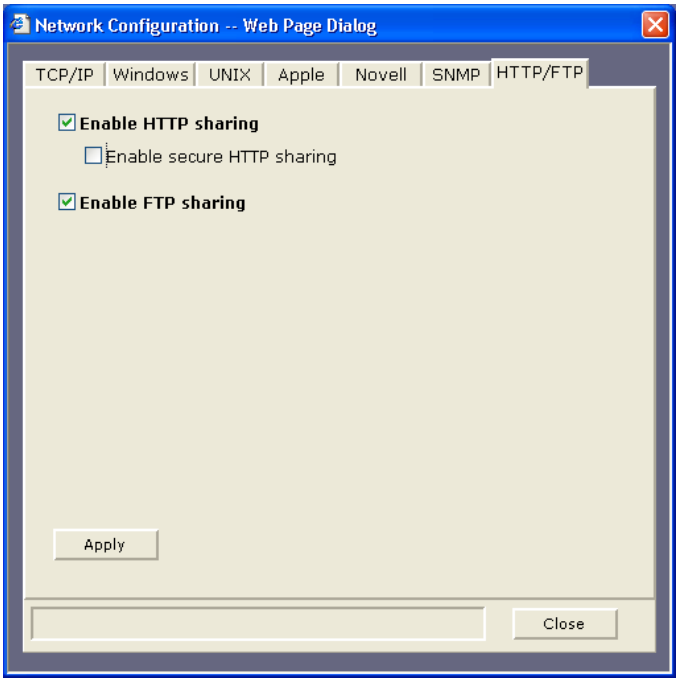
| Item | Description |
|---|---|
| Set IPX Protocol dropdown menu | |
| Internal Network Number | |
| Ethernet II | |
| Ethernet 802.2 | |
| Ethernet 802.3 | |
| Ethernet SNAP | |
| Apply button | |
| Restore button | |

### SNMP Tab



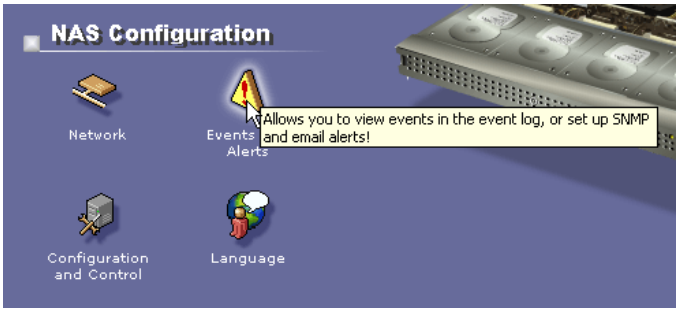

| Item | Description |
|---|---|
| Enable SNMP | |
| SNMP Community Name | |
| Apply button | |
| Restore button | |

### HTTP/FTP Tab




| Item | Description |
|---|---|
| Enable HTTP Sharing | |
| Enable Secure HTTP Sharing | |
| Enable FTP Sharing | |
| Apply button | |

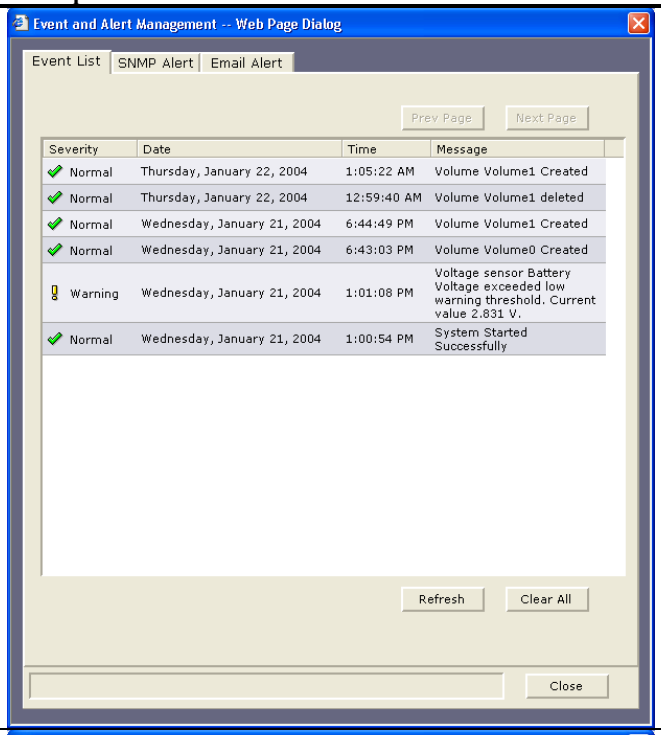
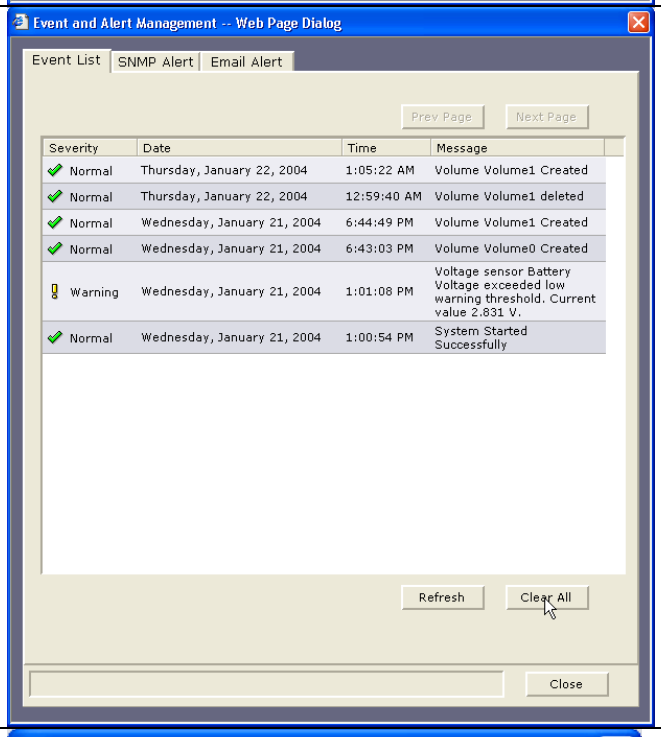
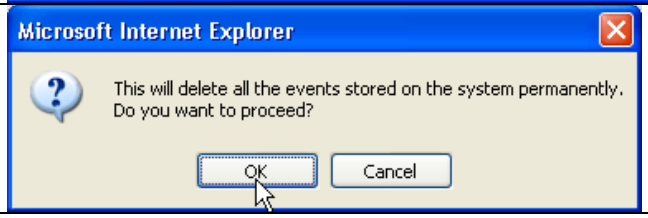
## Events and Alerts

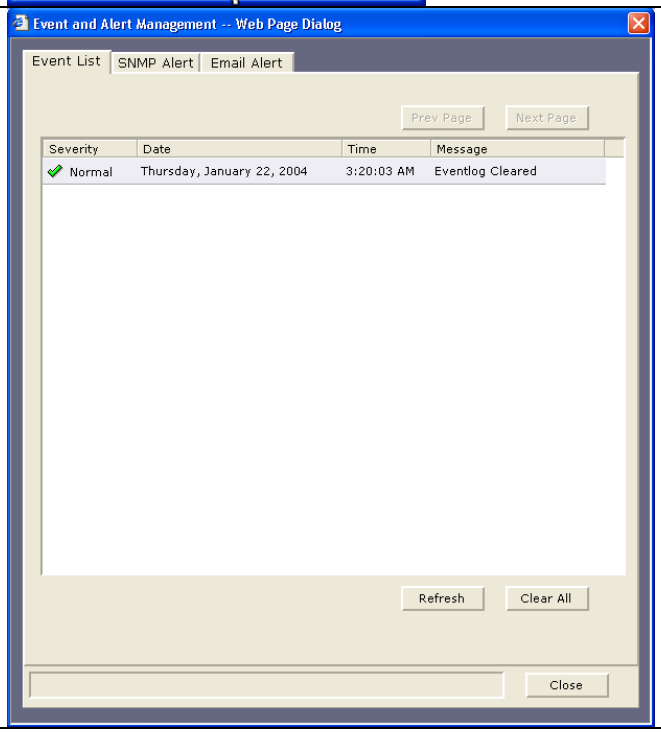

NAS Configuration
Network
Events and Alerts
Allows you to view events in the event log, or set up SNMP and email alerts!
Configuration and Control
Language

This section allows you to do the following:

- view all event log messages stored on your NAS server. There is no specified limit for the amount of log entries that your NAS server can store.
- set a remote mail server (SMTP) and up to four administrative email addresses to be notified of alert conditions.
- enable SNMP traps. This is used to send alert notifications, known as SNMP traps, to remote management servers.

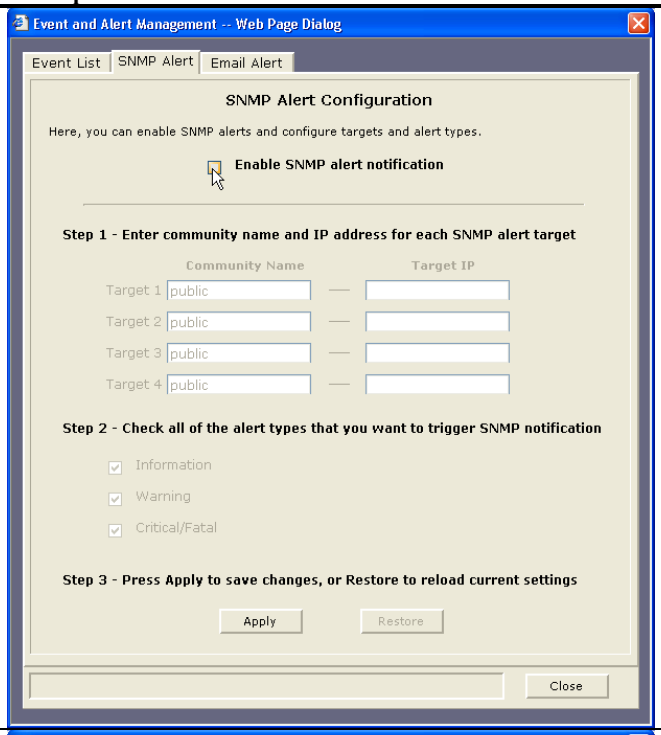
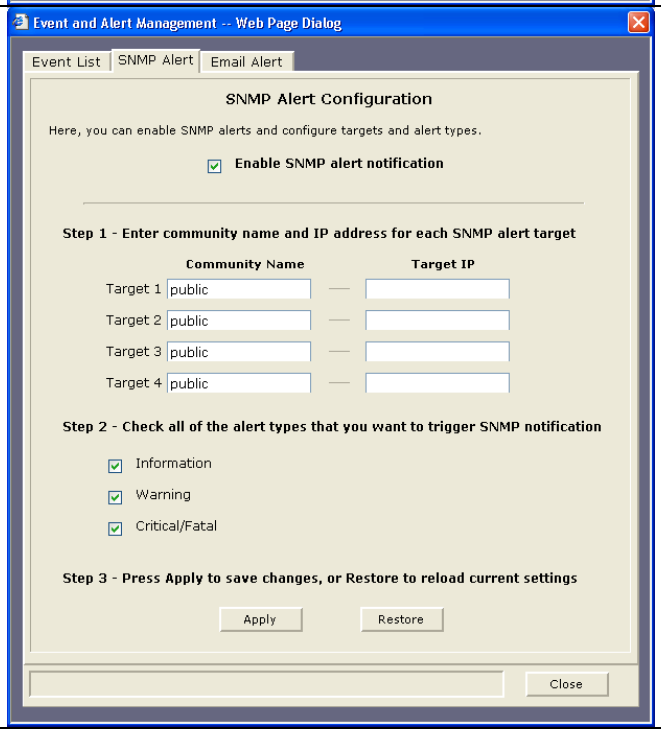
### Viewing and Clearing Events

| Step | Description |
|---|---|
| 1 |  |
| 2 |  |
| 3 |  |

| Step | Description |
|---|---|
| 4 | |
| 5 |  |

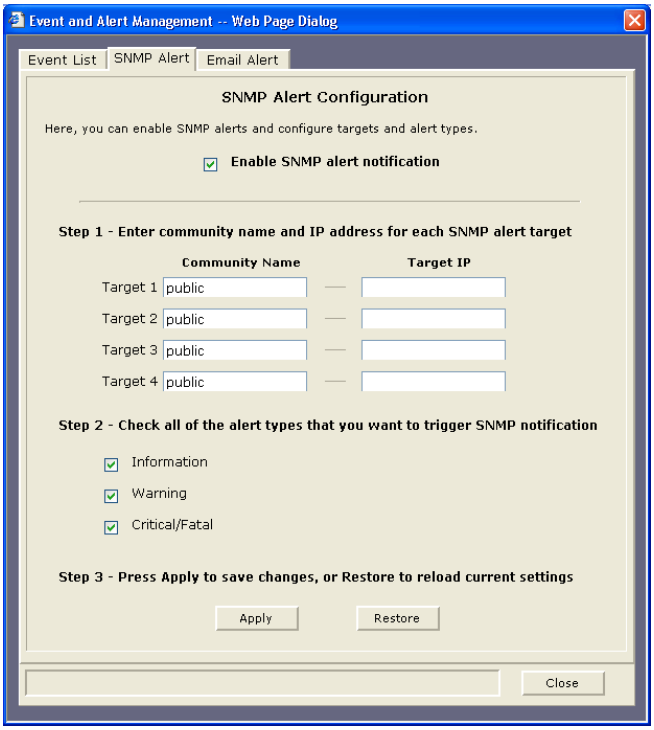
## Enabling SNMP Alerts

| Step | Description |
|---|---|

| Step | Description |
|---|---|
| 1 |  |
| 2 |  |

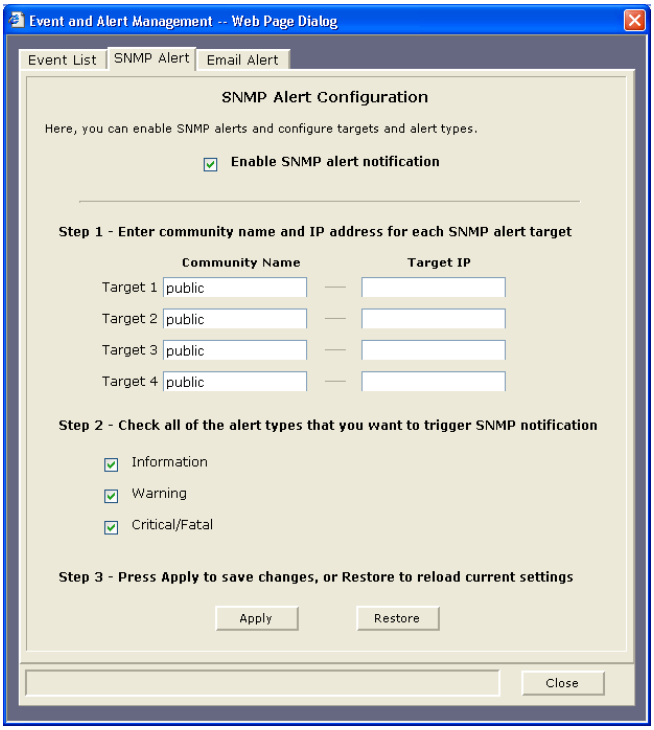
Event and Alert Management -- Web Page Dialog
Event List
SNMP Alert
Email Alert
SNMP Alert Configuration
Here, you can enable SNMP alerts and configure targets and alert types.
Enable SNMP alert notification
Step 1 - Enter community name and IP address for each SNMP alert target
Community Name
Target IP
Target 1 public
Target 2 public
Target 3 public
Target 4 public
Step 2 - Check all of the alert types that you want to trigger SNMP notification
Information
Warning
Critical/Fatal
Step 3 - Press Apply to save changes, or Restore to reload current settings
Apply
Restore
Close

## Configuring SNMP Targets


Event and Alert Management -- Web Page Dialog
Event List
SNMP Alert
Email Alert
SNMP Alert Configuration
Here, you can enable SNMP alerts and configure targets and alert types.
Enable SNMP alert notification
Step 1 - Enter community name and IP address for each SNMP alert target
Community Name
Target IP
Target 1 public
Target 2 public
Target 3 public
Target 4 public
Step 2 - Check all of the alert types that you want to trigger SNMP notification
Information
Warning
Critical/Fatal
Step 3 - Press Apply to save changes, or Restore to reload current settings
Apply
Restore
Close

| Field | Description |
|---|---|
| Community Name Column | |
| Target IP Column | |
| Target 1 through 4 | |

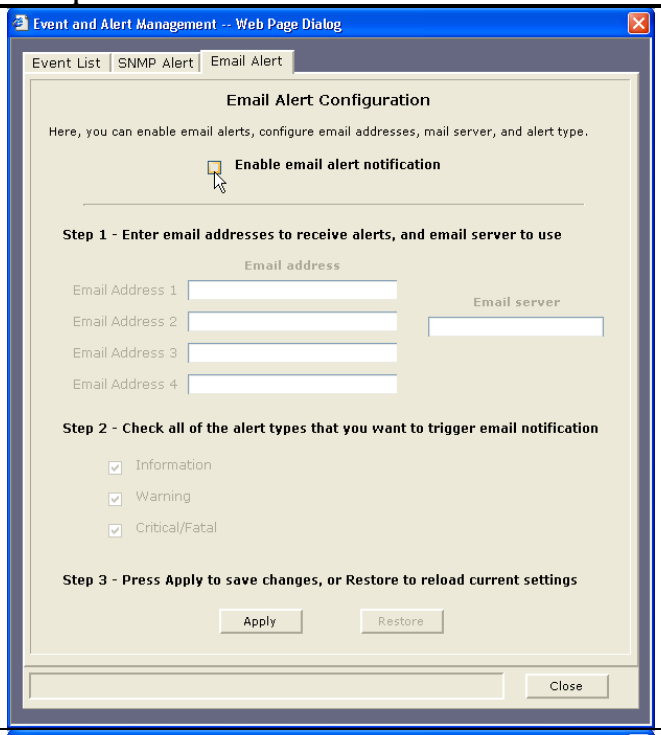
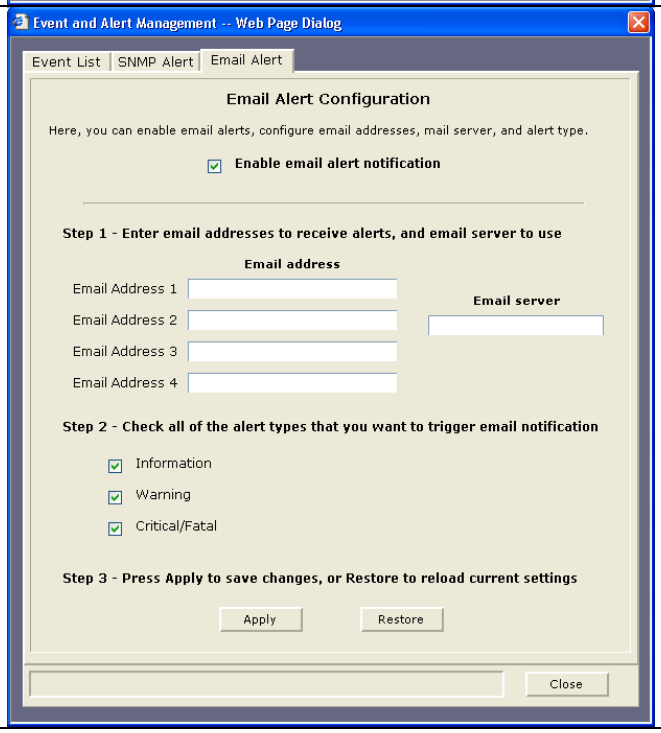
## Setting SNMP Alert Types


Event and Alert Management -- Web Page Dialog
Event List
SNMP Alert
Email Alert
SNMP Alert Configuration
Here, you can enable SNMP alerts and configure targets and alert types.
Enable SNMP alert notification
Step 1 - Enter community name and IP address for each SNMP alert target
Community Name
Target IP
Target 1 public
Target 2 public
Target 3 public
Target 4 public
Step 2 - Check all of the alert types that you want to trigger SNMP notification
Information
Warning
Critical/Fatal
Step 3 - Press Apply to save changes, or Restore to reload current settings
Apply
Restore
Close

| Item | Description |
|---|---|
| Information | |
| Warning | |
| Critical/Fatal | |
| Apply button | |
| Restore button | |

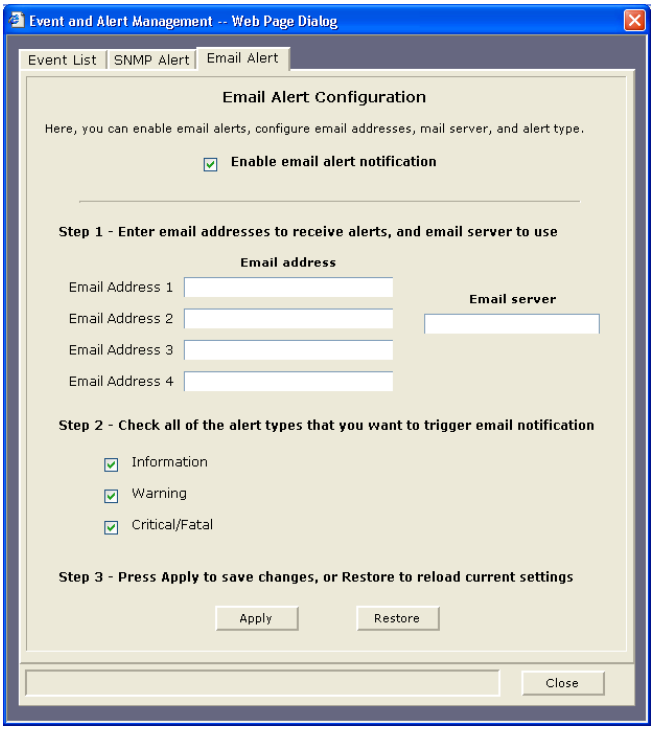
## Enabling Email Alerts

| Step | Description |
|---|---|

| Step | Description |
|---|---|
| 1 |  |
| 2 |  |

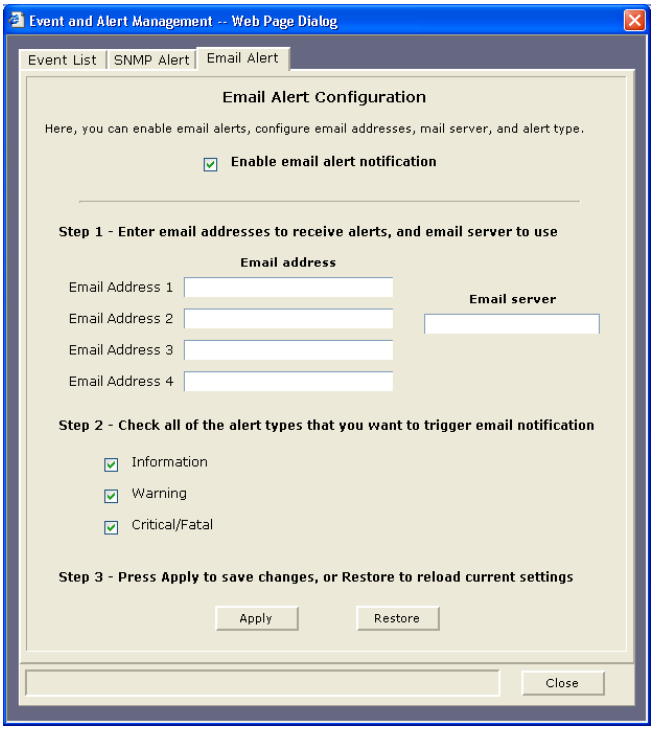
Event and Alert Management -- Web Page Dialog
Event List
SNMP Alert
Email Alert
Email Alert Configuration
Here, you can enable email alerts, configure email addresses, mail server, and alert type.
Enable email alert notification
Step 1 - Enter email addresses to receive alerts, and email server to use
Email address
Email Address 1
Email Address 2
Email Address 3
Email Address 4
Email server
Step 2 - Check all of the alert types that you want to trigger email notification
Information
Warning
Critical/Fatal
Step 3 - Press Apply to save changes, or Restore to reload current settings
Apply
Restore
Close

## Configuring Email Addresses and Mail Servers


Event and Alert Management -- Web Page Dialog
Event List
SNMP Alert
Email Alert
Email Alert Configuration
Here, you can enable email alerts, configure email addresses, mail server, and alert type.
Enable email alert notification
Step 1 - Enter email addresses to receive alerts, and email server to use
Email address
Email Address 1
Email Address 2
Email Address 3
Email Address 4
Email server
Step 2 - Check all of the alert types that you want to trigger email notification
Information
Warning
Critical/Fatal
Step 3 - Press Apply to save changes, or Restore to reload current settings
Apply
Restore
Close

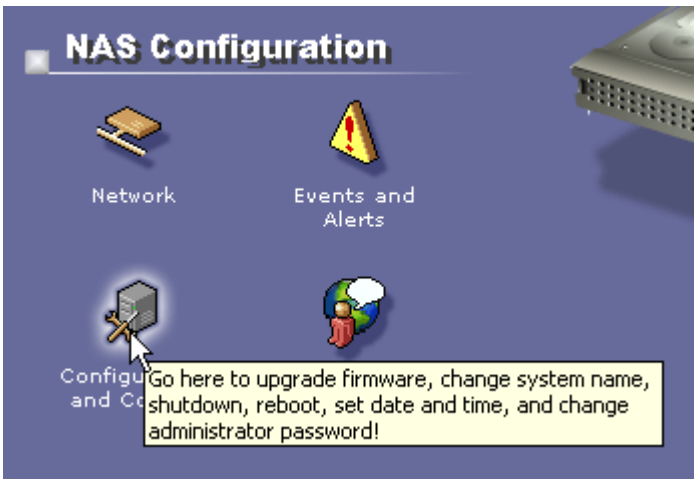
| Item | Description |
|---|---|
| Email Address Column | |
| Email Address 1 through 4 | |
| Email Server | |

## Setting Email Alert Types


Event and Alert Management -- Web Page Dialog
Event List
SNMP Alert
Email Alert
Email Alert Configuration
Here, you can enable email alerts, configure email addresses, mail server, and alert type.
Enable email alert notification
Step 1 - Enter email addresses to receive alerts, and email server to use
Email address
Email Address 1
Email Address 2
Email Address 3
Email Address 4
Email server
Step 2 - Check all of the alert types that you want to trigger email notification
Information
Warning
Critical/Fatal
Step 3 - Press Apply to save changes, or Restore to reload current settings
Apply
Restore
Close

| Item | Description |
|---|---|
| Information | |
| Warning | |
| Critical/Fatal | |
| Apply button | |
| Restore button | |

## Configuration and Control

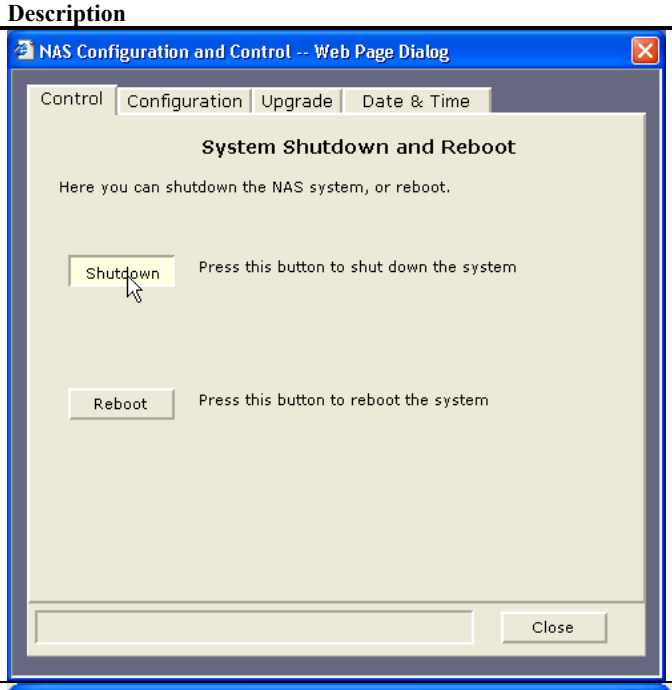
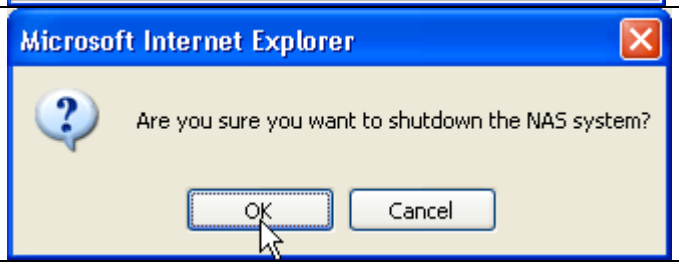

NAS Configuration
Network
Events and Alerts
Go here to upgrade firmware, change system name, shutdown, reboot, set date and time, and change administrator password!

This section allows you to do the following:

- shutdown or restart the NAS server.
- change the system name of your NAS server.
- change the root password.

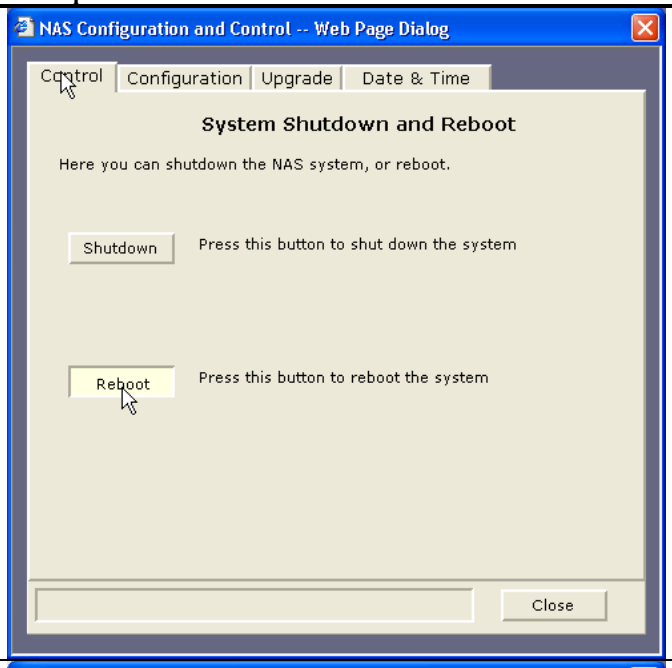
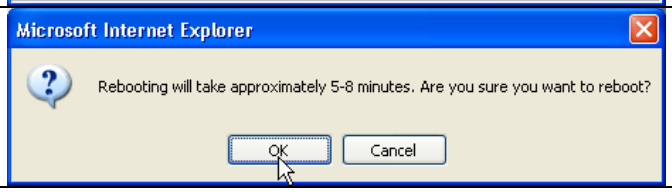
- upgrade the firmware.
- adjust the date and time.

### Shutting Down Your NAS Server

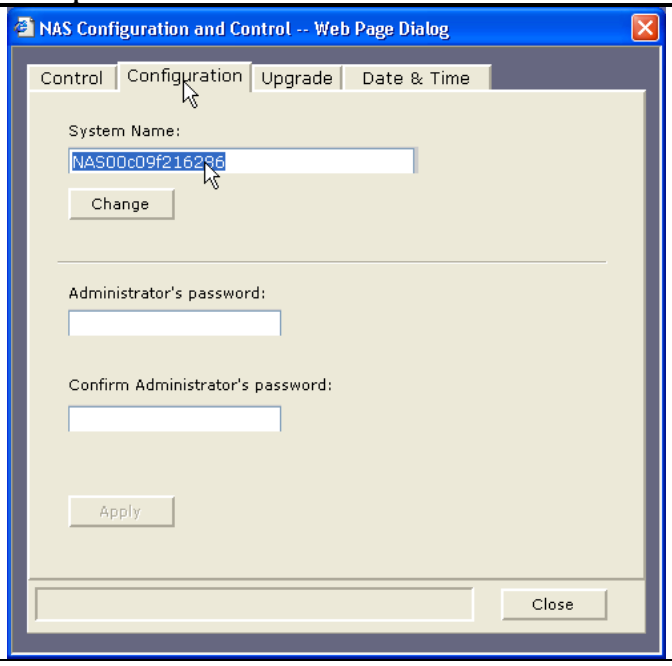
| Step | Description |
|---|---|
| 1 |  |
| 2 |  |

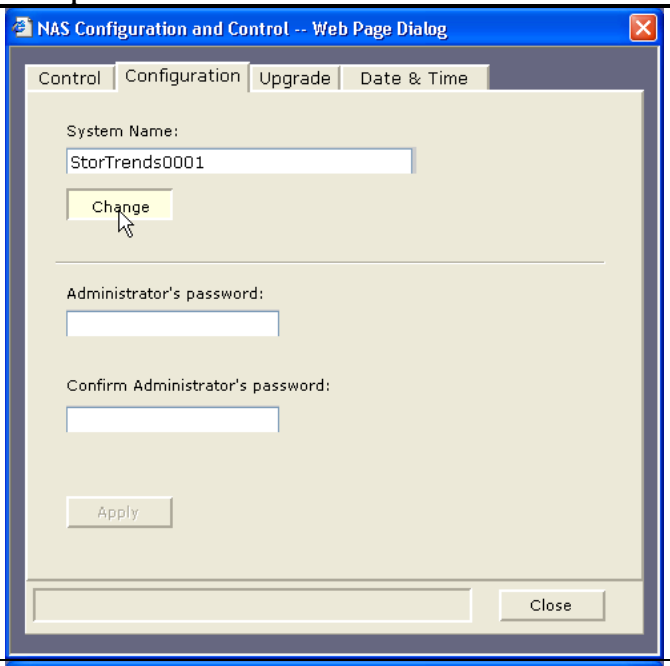
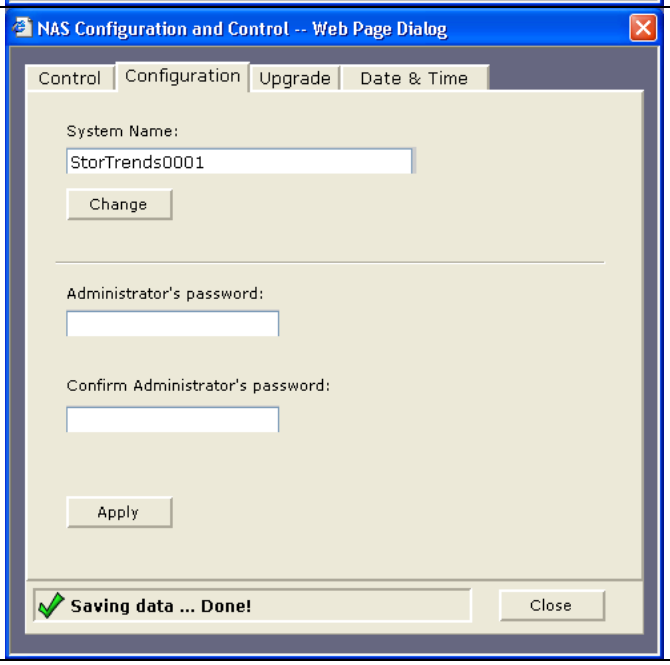
### Restarting Your NAS Server

| Step | Description |
|---|---|

| Step | Description |
|---|---|
| 1 |  |
| 2 |  |

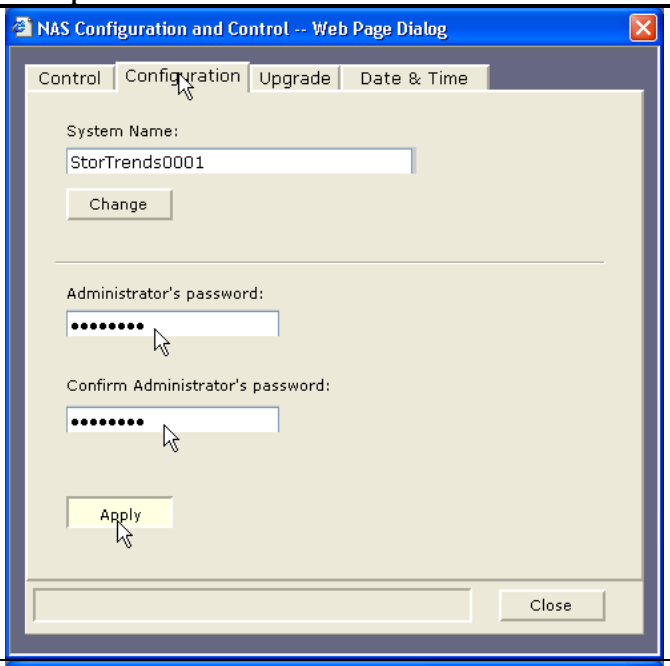
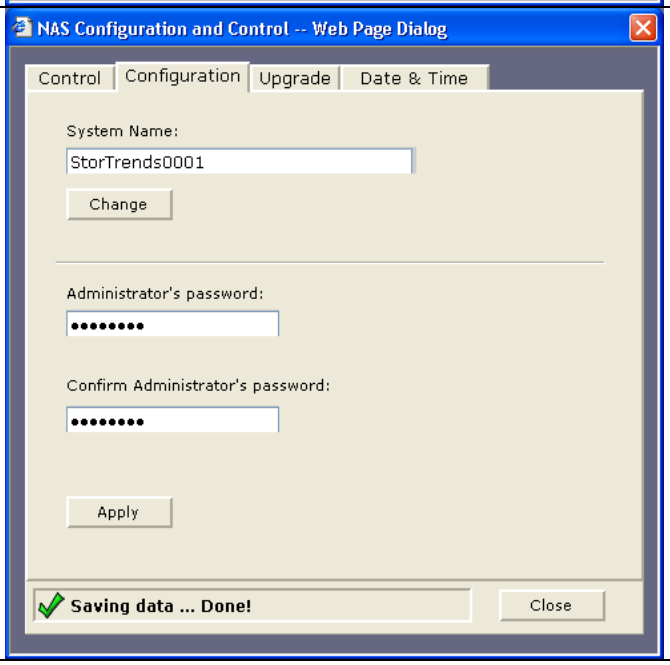
## Editing Your NAS Server's System Name

| Step | Description |
|---|---|
| 1 |  |

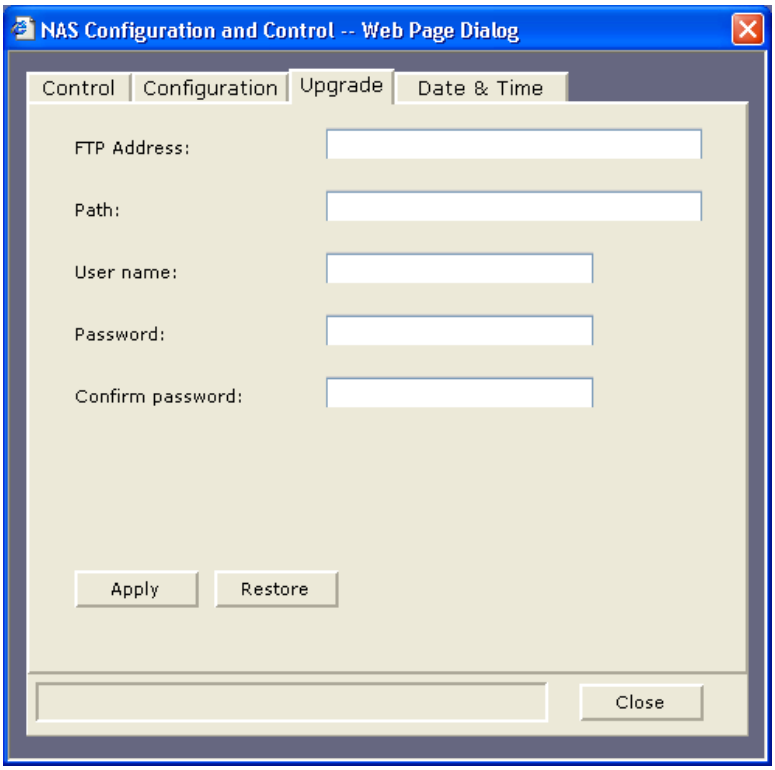
| Step | Description |
|---|---|
| 2 |  |
| 3 |  |

## Changing the Administrative/Root Password

| Step | Description |
|---|---|

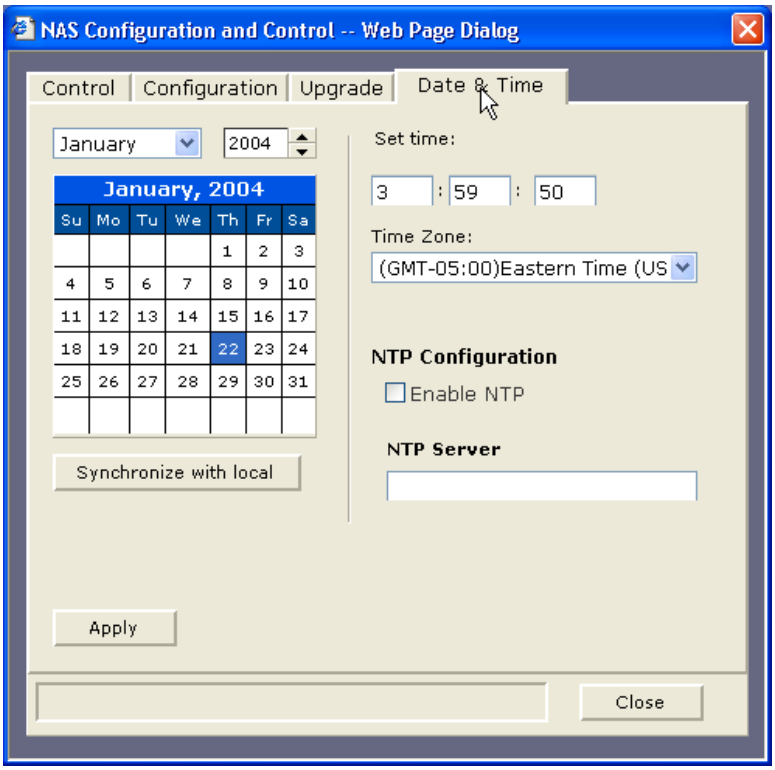
| Step | Description |
|---|---|
| 1 |  |
| 2 |  |

## Upgrading Your NAS Software



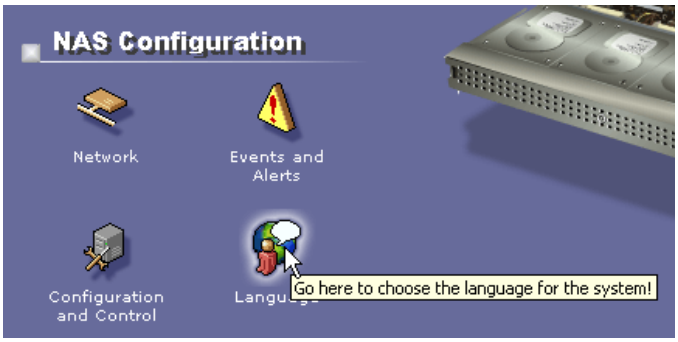

| Item | Description |
|---|---|
| FTP Address | |
| Path | |
| User Name | |
| Password | |
| Confirm Password | |
| Apply button | |
| Restore button | |

## Adjusting the Date and Time on Your NAS Server



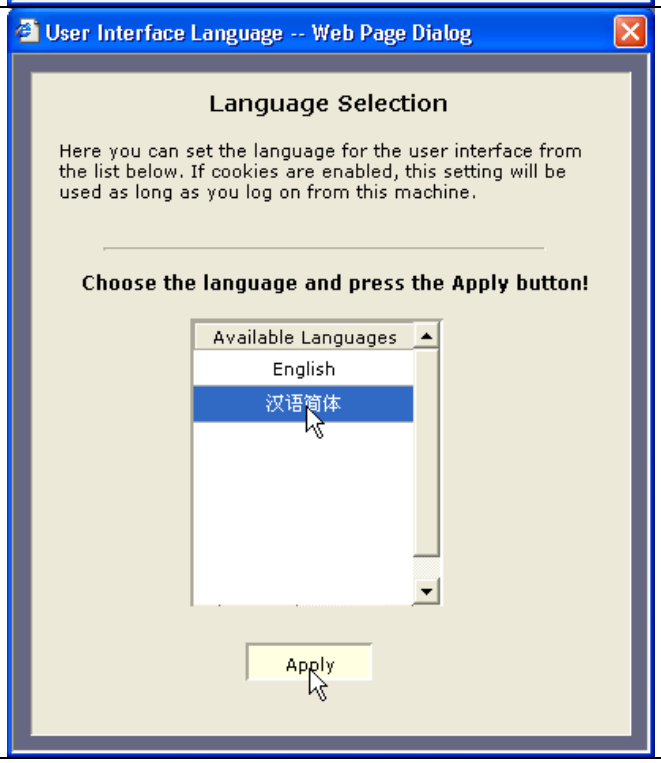

| Item | Description |
|---|---|
| Month dropdown menu | |
| Year dropdown menu | |
| Date calendar | |
| Synchronize with Local button | |
| Set Time Fields | |
| Time Zone dropdown menu | |
| Enable NTP box | |
| NTP Server | |
| Apply button | |

## Language



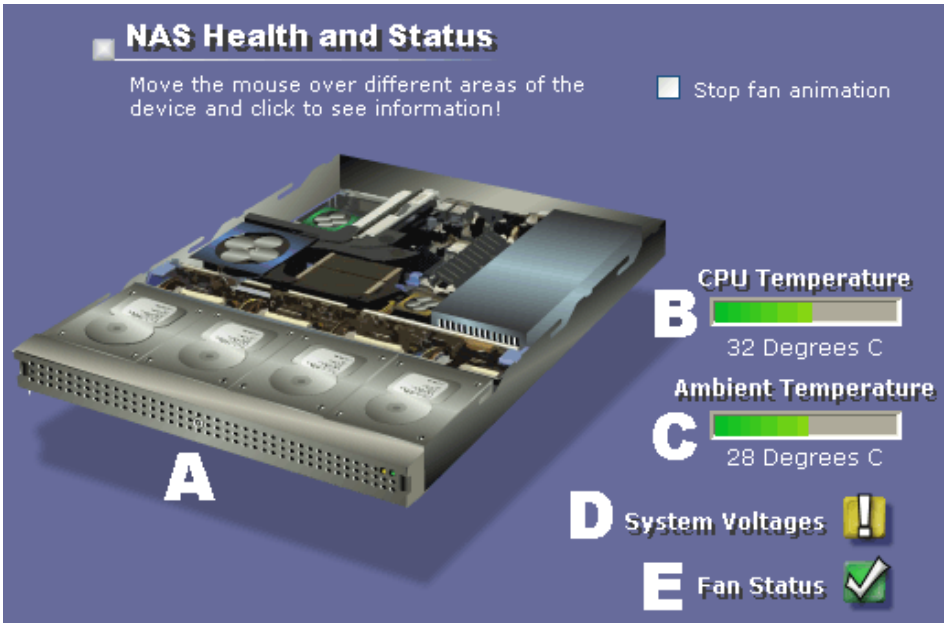

This section allows you to change the language of your NAS software. The default language is *English*.

## Changing the Language

| Step | Description |
|---|---|
| 1 | |
| 2 |  |

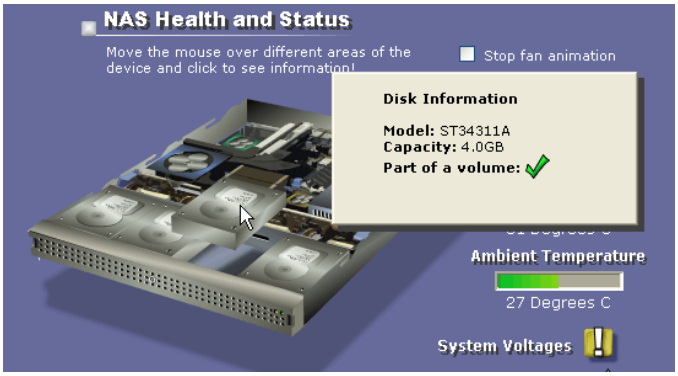
| Step | Description |
|---|---|
| 3 | |

## NAS Health and Status Information Section

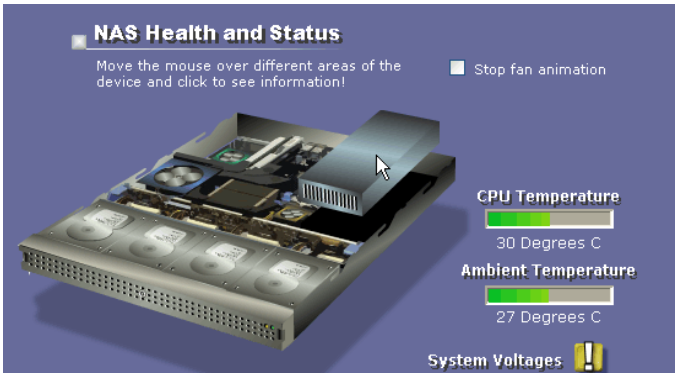



| Name | Location | Description |
|---|---|---|
| StorTrends 2104 Server | A | This section allows you to mouse over a hard disk drive bay to view the hard disk drive information. You can also mouse over the power supply to view its information. |
| CPU Temperature | B | This section allows you to quickly view the core temperature of the processor. |
| Ambient Temperature | C | This section allows you to quickly view the temperature inside the StorTrends 2104 chassis. |
| System Voltages | D | You can click on the icon to the right of *System Voltages* to view the voltages and fan RPMs of the StorTrends 2104 server. |
| Fan Status | E | You can click on the icon to the right of *Fan Status* to view the voltages and fan RPMs of the StorTrends 2104 server. |

### StorTrends 2104 Server

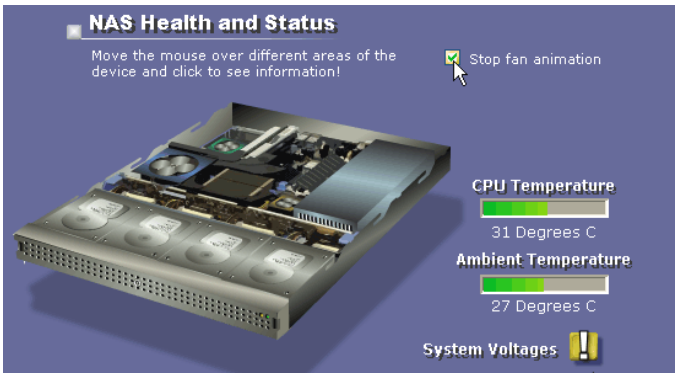



This section allows you to mouse over a hard disk drive bay to view the hard disk drive information.


NAS Health and Status
Move the mouse over different areas of the device and click to see information!
Stop fan animation
CPU Temperature
30 Degrees C
Ambient Temperature
27 Degrees C
System Voltages

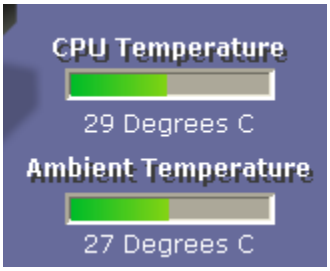
You can also mouse over the power supply to view its information.

**Note:** You can stop the fan animation by left clicking the box next to *Stop Fan Animation*.


NAS Health and Status
Move the mouse over different areas of the device and click to see information!
Stop fan animation
CPU Temperature
31 Degrees C
Ambient Temperature
27 Degrees C
System Voltages

---

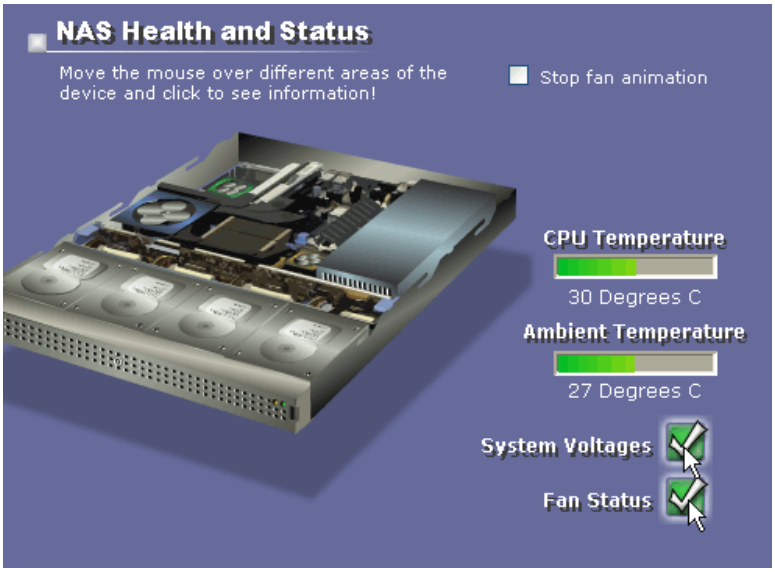
**CPU and Ambient Temperature**



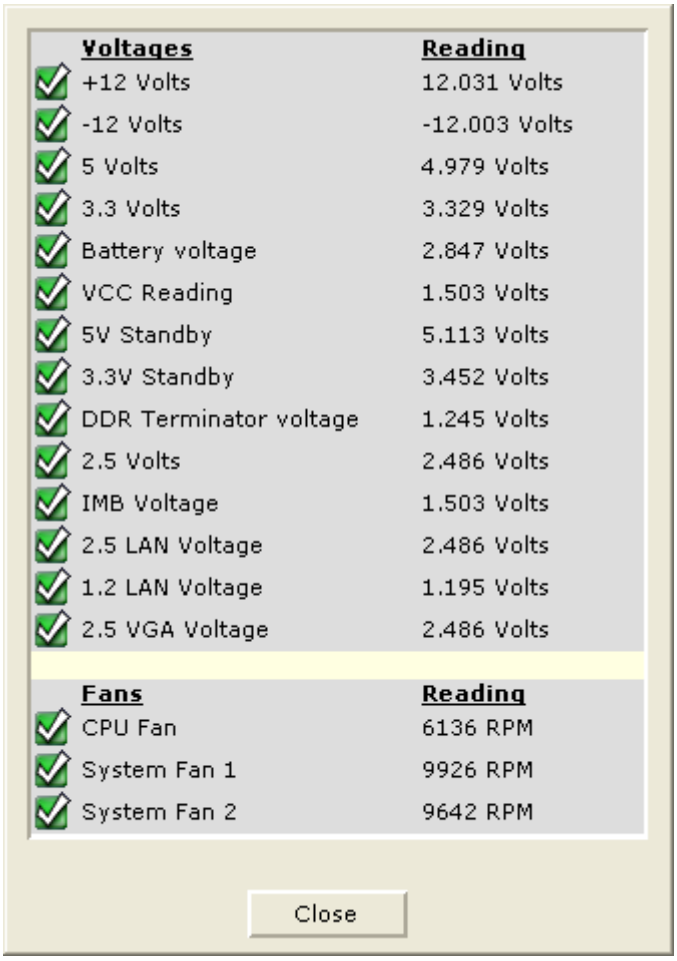

This section allows you to quickly view the core temperature of the processor and the temperature inside the StorTrends 2104 chassis.

---

**System Voltages and Fan Status**




You can click on the icon to the right of *System Voltages* or *Fan Status* to view the voltages and fan RPMs of the StorTrends 2104 server.



# Appendix A Expansion Card Compatibility List

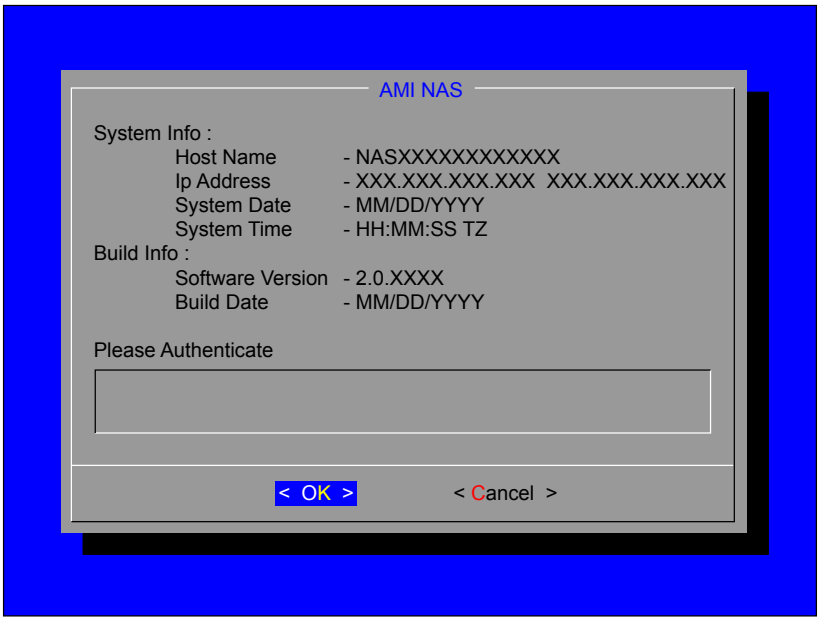
## Compatibility List

| Type | Manufacture and Model |
|---|---|
| Plug In PCI IDE Controller | To be decided |
| | |
| | |
| Plug In PCI SCSI Controller | To be decided |
| | |
| | |
| Other | American Megatrends MegaRAC G2 (series 827) |
| | American Megatrends MegaRAC G3 (series 840) |
| | |

**Note:** Expansion cards that are not on the compatibility list may not perform as expected and could result in loss of data or data corruption. Only the expansion cards on the compatibility list are fully supported by the StorTrends RTG NAS Software. At the time that this software was released, these were the only supported expansion cards. For the most up to date compatibility list, please visit **www.stortrends.com**.

# Appendix B Console User Interface

## Overview



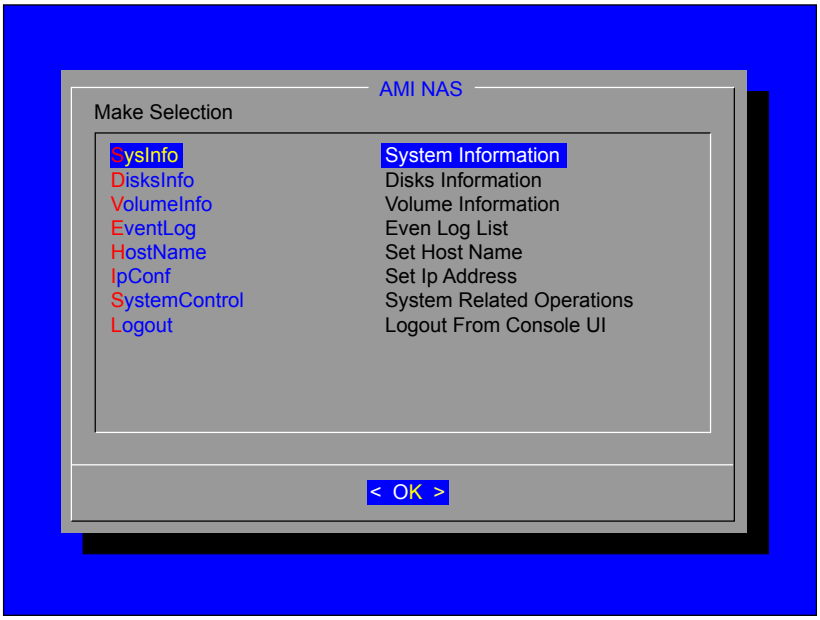

You can set up your NAS server using the Console User Interface (UI). When you first boot up your NAS server, you are presented with the AMI NAS authentication screen. The AMI NAS authentication screen displays the following fields:

| Name | Description |
|---|---|
| Host Name | This field displays the host name of the NAS server. The default system name is `nasxxxxxxxxxxxx`, where `xxxxxxxxxxxx` is the MAC address. For example, if your MAC address is 00112233445566, then your NAS server's network name (host name) is **`nas00112233445566`**. |
| IP Address | This field displays the IP address of the network interface card(s). |
| System Date | This field displays the month, day, and year that is set on the NAS server. |
| System Time | This field displays the hour, minute, and seconds that is set on the NAS server. |
| Software Version | This field displays the version of the NAS software. |
| Build Date | This field displays the build date of the NAS software. |
| Please Authenticate | This field allows you to type the **root** password of the NAS server so that you can log into the *Console UI*. |

### Navigation

| Keyboard Key | Function |
|---|---|
| <ARROW UP> | Moves the cursor up. |
| <ARROW DOWN> | Moves the cursor down. |
| <ARROW LEFT> | Moves the cursor to the left. |
| <ARROW RIGHT> | Moves the cursor to the right |
| <TAB> | Switches between separate fields. |
| <SPACE> | Used to select and set an option. It can also be used to deselect an option. |
| <ENTER> | Executes selected function. |

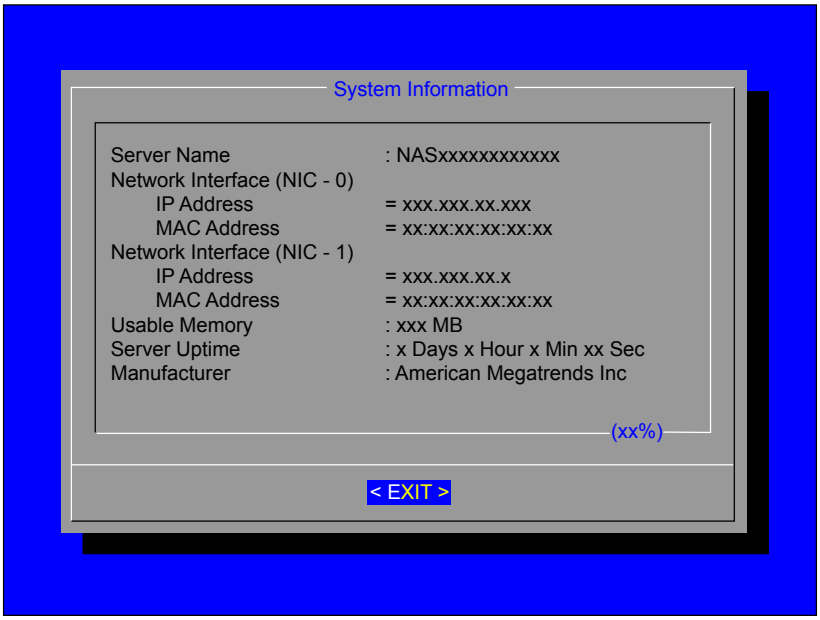
## Main Menu




The main menu is the first screen that you see when you log into the Console UI of your NAS server. Navigate to the section you want to view or configure.

| Name | Description |
|---|---|
| SysInfo | This option allows you to view the *System Information* screen. |
| DiskInfo | This option allows you to view the hard disk drive information. |
| VolumeInfo | This option allows you to view the *Volume* information. |
| EventLog | This option allows you to view the event log of your NAS server. |
| HostName | This option allows you to set the host name. |
| IpConf | This option allows you to configure all the IP settings of each network interface card in you NAS server. |
| SystemControl | This option allows you to warm boot or power down your NAS server. |
| LogOut | This option allows you to logout and exit from the AMI NAS Console UI. |

## System Information

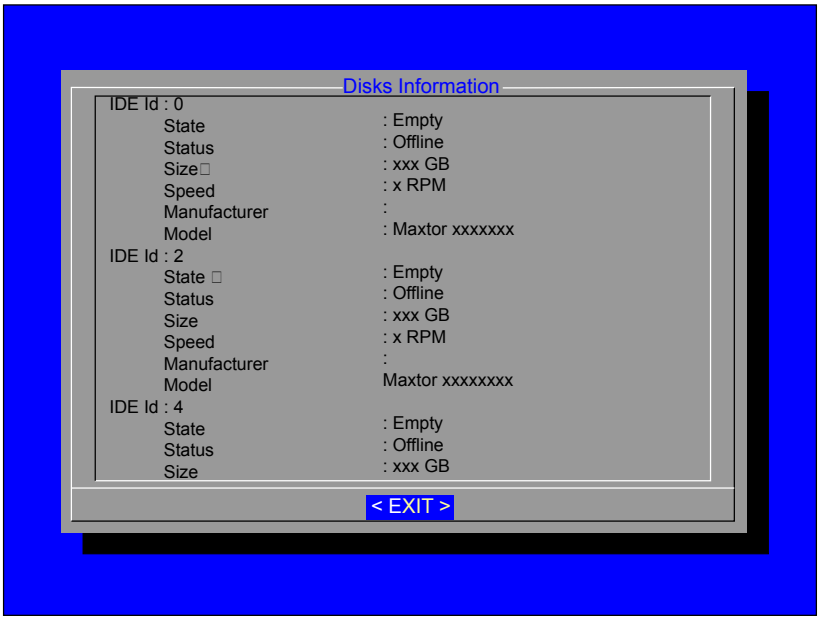

System Information
Server Name : NASxxxxxxxxxxx
Network Interface (NIC - 0)
IP Address = xxx.xxx.xx.xxx
MAC Address = xx:xx:xx:xx:xx:xx
Network Interface (NIC - 1)
IP Address = xxx.xxx.xx.x
MAC Address = xx:xx:xx:xx:xx:xx
Usable Memory : xxx MB
Server Uptime : x Days x Hour x Min xx Sec
Manufacturer : American Megatrends Inc
(xx%)
< EXIT >

This *System Information* screen displays the following information:

| Name | Description |
|---|---|
| Server Name | This field displays the host name of the NAS server. The host name defaults to the letters **NAS** plus the MAC address of NIC-0. See the *System* section in *Chapter Three, Configuring Your NAS Server* for more information. |
| Network Interface IP Address | This field displays the IP address of the network interface card. |
| Network Interface MAC Address | This field displays the MAC address of the network interface card. |
| Usable Memory | This field displays the available system memory that can be used. |
| Server Uptime | This field displays the amount of time that the NAS server has been consecutively running. Any warm boots or cold boots can cause the *Server Uptime* to be reset. |
| Manufacturer | This field lets you know which company supplied the NAS software. |

To go back to main menu, press the <ENTER> key.

## Disk Information




This *Disk Information* screen displays each hard disk drive in your NAS server with the following corresponding information:

| Name | Description | |
|---|---|---|
| IDE/SCSI ID | This field displays the physical location of the hard disk drive as it resides on the IDE/SCSI channel. For example, IDE ID zero (0) means that the hard disk drive is physically located on the primary master channel. IDE ID two (2) means that the hard disk drive is physically located on the secondary master channel. | |
| State | This field displays the state of the hard disk drive. The state of the hard disk drive can be one of the following: | |
| | Empty | This state means that the hard disk drive is available but not participating in a *Volume*. |
| | Good | This state means that the hard disk drive is participating in a *Volume* and is functioning properly. |
| | Bad | This state means that the hard disk drive is participating in a *Volume* but is in a failed state. |
| Status | This field displays the status of the hard disk drive. The status of the hard disk drive can be one of the following: | |
| | Online | This status means that the hard disk drive is physically present and participating in a *Volume*. |
| | Offline | This status means that the hard disk drive is physically present but not participating in a *Volume*. |
| | Rebuilding | This status means that the hard disk drive is physically present and is in the process of regenerating the *Volume*. |
| | Initializing | This status means that the hard disk drive was just inserted on the bus and is in the process of being recognized by the NAS server.<br><br>**Note:** The *Initializing Status* is available on SCSI backplanes and ATA backplanes that support hot plugging. |
| | Not Present | This status means that the hard disk drive is not physically present. |

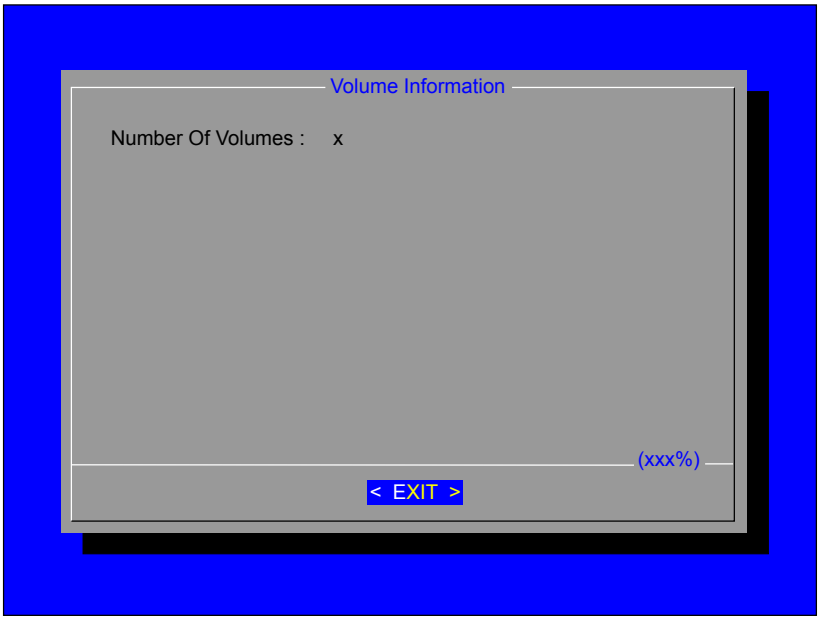
Cont'd

## Disk Information, Continued

| Name | Description |
|---|---|
| Size | This field displays the actual *on disk* size of the hard disk drive. This information is calculated by the *StorTrends NAS software*.<br><br>Most hard disk manufacturers follow the metric conventions of Kilobyte, Megabyte, and Gigabytes for specifying the drive capacity on their label and specifications (for example, 1000 B =1 KB, 1000 KB=1 MB and 1000 MB=1 GB) instead of the 1024 convention.<br><br>For example, given a manufacturer-specified 18.4 GB hard disk, the actual capacity reported by the disk is 17930455KB = 17930455 *1024 = 18360785920 Bytes. This, if converted to metric convention, results in the specified 18.36 GB capacity rounded up. Thus, the actual capacity of the 18.4 GB drive is displayed on this page as 17.1 GB. |
| Speed | This field displays the stated speed of the hard disk drive. This information is provided by the hard disk drive. If this information is not given by the hard disk drive, then the value for this field is zero (0). Speed is rated in Revolutions Per Minute (RPM). |
| Manufacturer | This field displays the stated manufacturer of the hard disk drive. This information is provided by the hard disk drive. If this information is not given by the hard disk drive, then the value for this field is zero (0). |
| Model | This field displays the stated model of the hard disk drive. This information is provided by the hard disk drive. If this information is not given by the hard disk drive, then the value for this field is zero (0). |

To go back to main menu, press the <ENTER> key.

## Volume Information




This *Volume Information* screen displays each *Volume* configured in your NAS server with the following corresponding information:

| Name | Description | |
|---|---|---|
| Status | This field displays the status of the *Volume*. The status of the *Volume* can be one of the following: | |
| | Optimal | This status means that the *Volume* is fully functional and is working at peak efficiency. |
| | Failed | This status means that the *Volume* has fatally A *Degraded* status can indicate multiple hard disk drive failures. |

Cont'd

## Volume Information, Continued

| Name | Description | |
|---|---|---|
| Status, Continued | Degraded | This status means that the *Volume* has been compromised and needs to be rebuilt. A *Degraded* status can indicate a hard disk drive failure or that the data on the *Volume* is corrupt. |
| | Initializing | This status means that the hard disk drive was just inserted on the bus and is in the process of being recognized by the NAS server.<br><br>**Note:** The *Initializing Status* is available on SCSI backplanes and ATA backplanes that support hot plugging. |
| | Formatting | This status means that the *Volume* is being formatted by the *StorTrends NAS software*. |
| | Rebuilding | This status means that the *Volume* is being regenerated. |
| Name | This field displays the name of the *Volume*. The name of the *Volume* is represented as the word **`Volume`** followed by a numeric designation such as, 0,1,2,3,4, and so on. | |
| Capacity | This field displays the total size of the *Volume*. | |
| Available | This field displays the remaining disk space on the *Volume*. | |
| RAID Level | This field displays the level of RAID used on the *Volume*. See the *Volume* section in *Chapter Three, Configuring Your NAS Server* for more information on how to assign a *RAID Level* during the creation of your *Volume*. See A*ppendix C, RAID* for more information about the supported *RAID Levels*. | |
| Stripe Size | This field displays the type of striping used on the *Volume*. See the *Volume* section in *Chapter Three, Configuring Your NAS Server* for more information on how to assign a *Stripe Size* during the creation of your *Volume*. | |
| Creation Date | This field displays the date the *Volume* was made. | |
| Disk(s) Involved | This field displays the physical hard disk drives used in the *Volume*. All hard disk drives involved in the same *Volume* will drop down in capacity to match the lowest capacity hard disk drive. For example, if you are mirroring a 40 GB hard disk drive with a 60 GB hard disk drive, the 60 GB hard disk drive will loose 20 GB. In conclusion, You will only have a 40 GB *Volume*. | |

To go back to main menu, press the <ENTER> key.

**Note:** Most hard disk manufacturers follow the metric conventions of Kilobyte, Megabyte, and Gigabytes for specifying the drive capacity on their label and specifications (for example, 1000 B =1 KB, 1000 KB=1 MB and 1000 MB=1 GB) instead of the 1024 convention.

For example, given a manufacturer-specified 18.4 GB hard disk, the actual capacity reported by the disk is 17930455KB = 17930455 *1024 = 18360785920 Bytes. This, if converted to metric convention, results in the specified 18.36 GB capacity rounded up. Thus, the actual capacity of the 18.4 GB drive is displayed on this page as 17.1 GB.

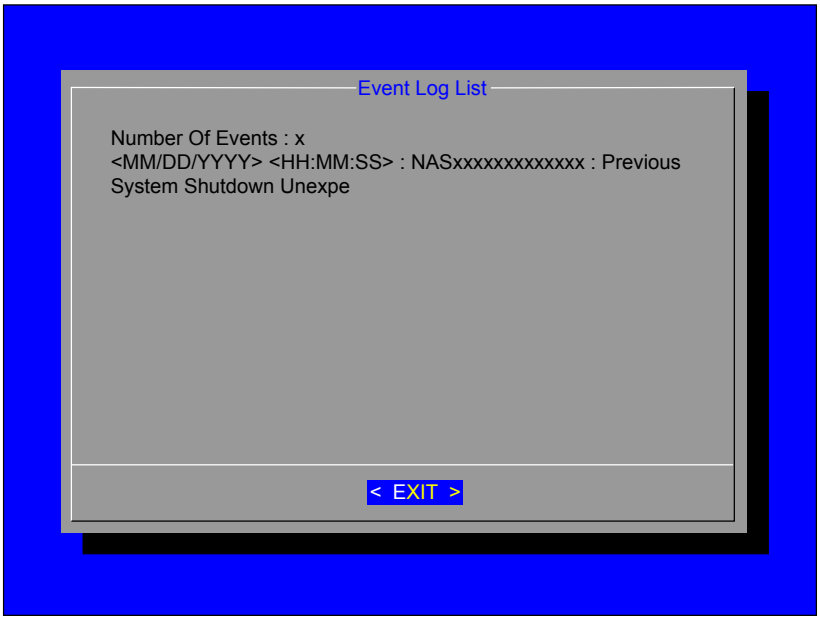
Using the RAID level five with six hard disk drives yields a raw capacity of 17930455 K times five = 89652275 K. But each hard disk drive uses some space for the RAID configuration resulting in 89651520 K. This is an overhead of approximately 150 K per hard disk drive.

During file system formatting, the **`superblock`** and the **`inodes`** tree use a big chunk of space. The bigger the hard disk drive size, the more **`inodes`** are created. One **`inode`** is created for every 4096 Bytes. Thus resulting in a usable size of 79942087 K.

Quotas are stored in two files called **`quota.user`** and **`quota.group`**. They use some of the useable space.

Thus resulting in a final available space of 79942039 K = 76.24 G and the overall overhead (wastage) is approximately ten percent.

## Event Log List




This section allows you to view the all event logs stored on your NAS server. The NAS server can store up to 1000 log entries.

To go back to main menu, press the <ENTER> key.

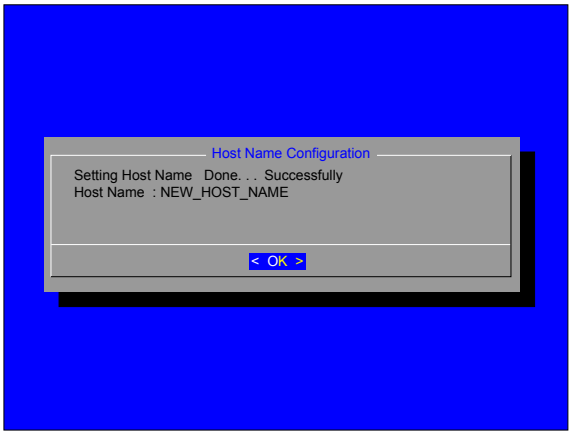
## Set Host Name

This subsection allows you to change the network name (host name) of your NAS server.

### Changing the Host Name

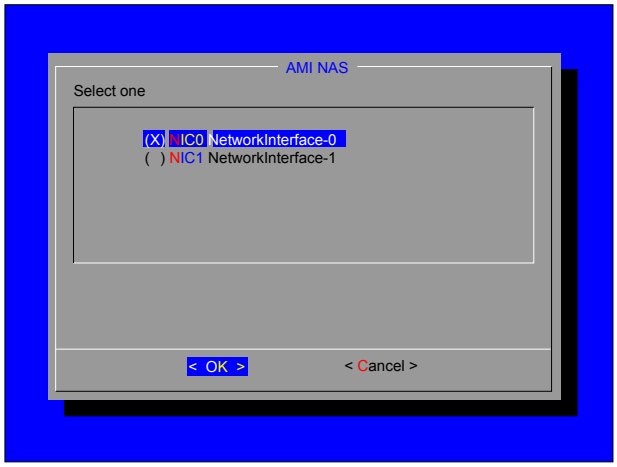
| Name | Description |
|---|---|
| Host Name | The default system name is `nasxxxxxxxxxxxx`, where `xxxxxxxxxxxx` is the MAC address. For example, if your MAC address is 00112233445566, then your NAS server's network name (host name) is **`nas00112233445566`**. |
| Empty field | This field allows you to enter a unique host name to identify your NAS server on your network. After you type in your NAS servers new host name, press the <ENTER> key. |

**Note:** The host name must be a minimum of eight characters and a maximum of sixteen characters. The host name is not case-sensitive. Parenthesis, slashes, asterisks, spaces, the *at* sign (@), and the *hash* sign (#) are not allowed. The *at* sign (@) and the *hash* sign (#) characters have special meanings on some UNIX based servers.




You are prompted with a confirmation screen stating that the host name was renamed successfully. To go back to main menu, press the <ENTER> key.

## Set IP Address



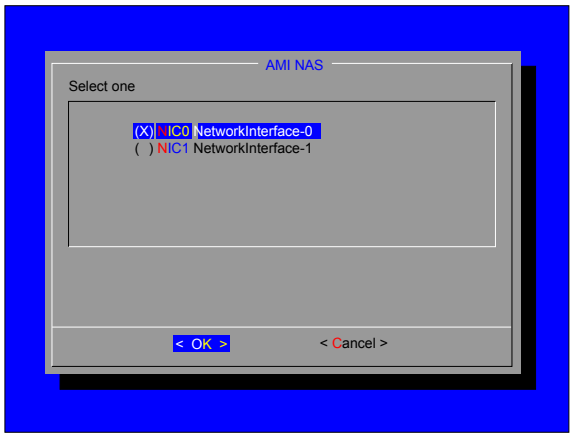

This screen allows you to configure TCP/IP automatically via DHCP server or by specifying the addresses statically for the following:

- IP address (Server)
- Subnet Mask
- Default Gateway
- Primary DNS Server
- Secondary DNS Server

### Configuring TCP/IP

To configure your NAS server with static settings, follow the steps in the following table.

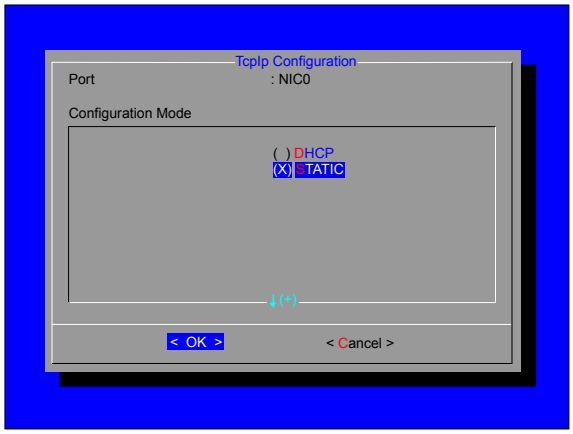
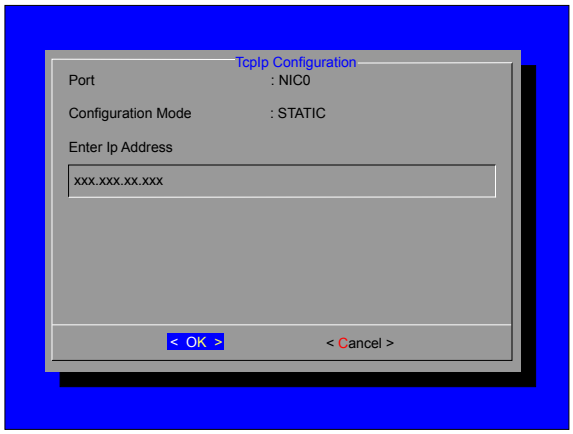
**Note:** DHCP is not explained in this document due to the fact that DHCP is the default setting.

| Step | Action |
|---|---|
| 1 | Navigate to the network interface card you want to configure. Press the <ENTER> key to continue.  |



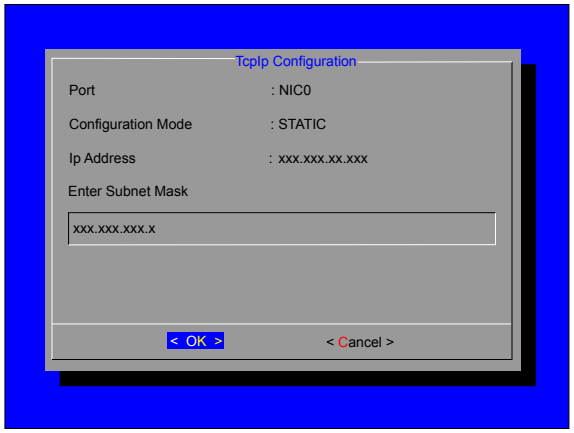
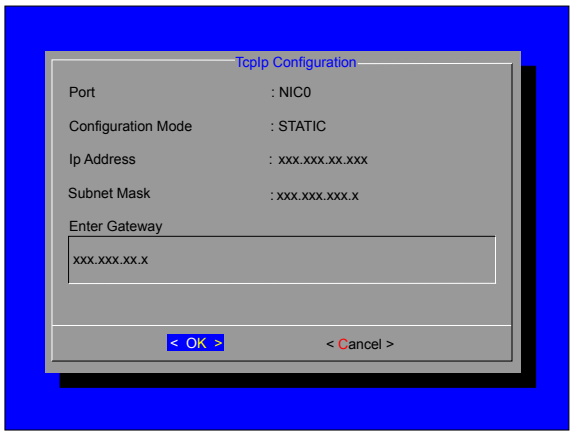
Cont'd

### Configuring TCP/IP, Continued

| Step | Action |
|---|---|
| 2 | Highlight the STATIC option by navigating to it. Press the <ENTER> key to continue.<br>  |
| 3 | Type the static IP address you want the network interface card to use. Press the <ENTER> key to continue.<br>  |

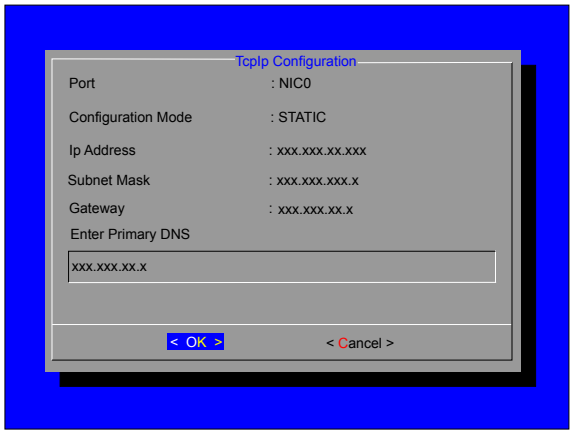
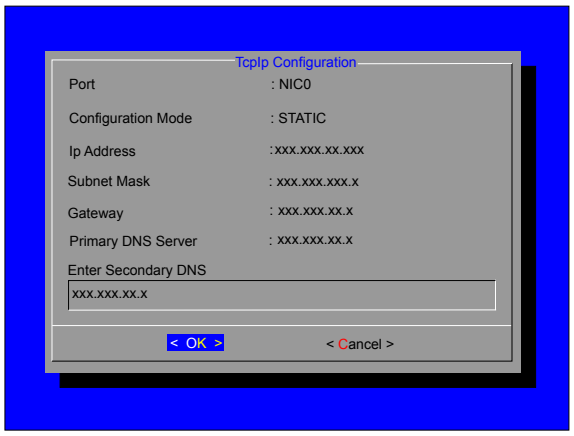
Cont'd

### Configuring TCP/IP, Continued

| Step | Action |
|---|---|
| 4 | Type the subnet mask you want the network interface card to use. Press the <ENTER> key to continue.<br>  |
| 5 | Type the IP address of the gateway you want the network interface card to use. Press the <ENTER> key to continue. This field must have an entry and cannot be left blank. If you do have a gateway installed on your network, enter `0.0.0.0` for the value of this field.<br>  |

Cont'd

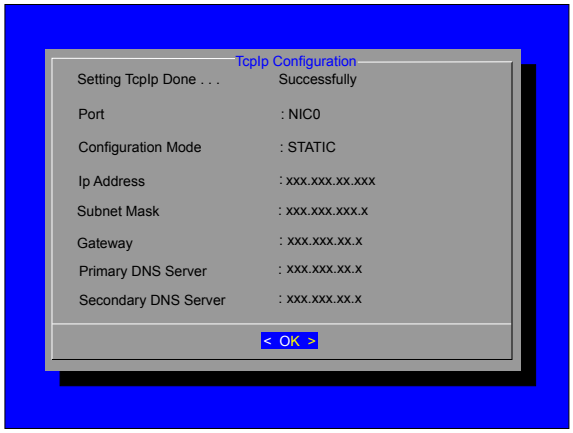
### Configuring TCP/IP, Continued

| Step | Action |
|---|---|
| 6 | Type the IP address of your network's primary DNS you want the network interface card to use. Press the <ENTER> key to continue. This field must have an entry and cannot be left blank. If you do have a primary or secondary DNS installed on your network, enter **`0.0.0.0`** for the value of this field.<br>  |
| 7 | Type the IP address of your network's secondary DNS you want the network interface card to use. Press the <ENTER> key to continue. This field must have an entry and cannot be left blank. If you do have a secondary DNS installed on your network, enter **`0.0.0.0`** for the value of this field.<br>  |

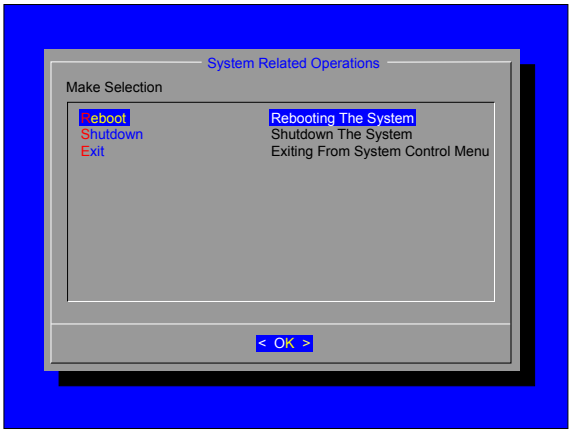
Cont'd

### Configuring TCP/IP, Continued

| Step | Action |
|---|---|
| 8 | You are prompted with a confirmation screen stating that the TCP/IP was configured successfully. To go back to main menu, press the <ENTER> key. |


TcpIp Configuration
Setting TcpIp Done . . . Successfully
Port : NIC0
Configuration Mode : STATIC
Ip Address : xxx.xxx.xx.xxx
Subnet Mask : xxx.xxx.xxx.x
Gateway : xxx.xxx.xx.x
Primary DNS Server : xxx.xxx.xx.x
Secondary DNS Server : xxx.xxx.xx.x
< OK >

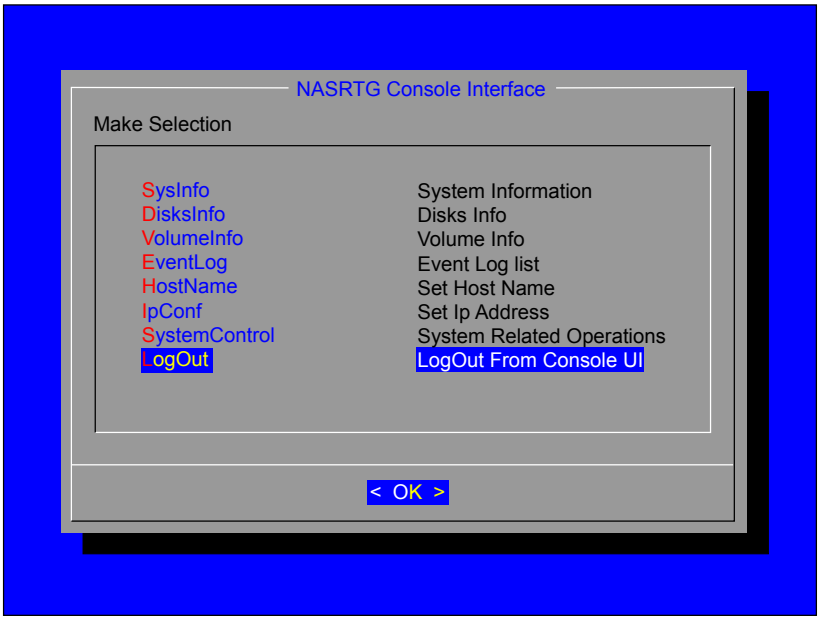
## System Related Operations



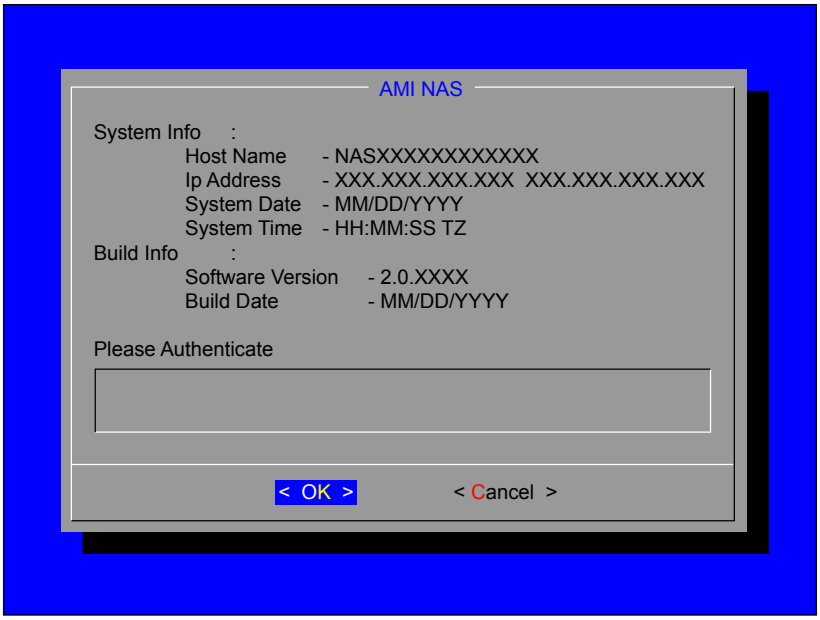

This option allows you to warm boot or power down your NAS server.

| Name | Description |
|---|---|
| Reboot | This option allows you to gracefully warm boot your NAS server.<br> |
| Shutdown | This option allows you to gracefully power down your NAS server. |
| Exit | This option allows you to return to the main menu. |

## Log Out From Console UI




This option allows you to logout and exit from the AMI NAS Console UI. You are returned to the following screen:



# Appendix C RAID

## Introduction to RAID

RAID (Redundant Array of Independent Disks) is an array of multiple independent hard disk drives that provide high performance and fault tolerance. A RAID disk subsystem improves I/O (input/output) performance over a system using only a single hard disk drive. The RAID volume appears to the StorTrends 2104 server as a single storage unit or as multiple logical units. I/O is expedited because several hard disk drives can be accessed simultaneously. RAID systems improve data storage reliability and fault tolerance compared to single hard disk drive systems. Data loss due to a hard disk drive failure can be prevented by regenerating missing data from the remaining data and parity information stored on other hard disk drives in the volume.

## RAID Benefits

RAID has gained popularity because it improves I/O performance, and increases storage subsystem reliability. RAID provides data security through fault tolerance and redundant data storage.

### Improved I/O

Although hard disk drive capabilities have improved drastically, actual performance has improved only three to four times in the last decade. Computing performance has improved over 50 times during the same time period. RAID allows you to access several hard disk drives simultaneously.

### Increased Reliability

The electromechanical components of a hard disk drive operate more slowly, require more power, and generate more noise and vibration than electronic devices. These factors reduce the reliability of data stored on a hard disk drive. RAID systems improve data storage reliability and fault tolerance compared to single hard disk drive systems. The additional hard disk drives make it possible to prevent data loss from a hard disk drive failure. You can regenerate missing data from the remaining data and parity stored on other hard disk drives in the volume.

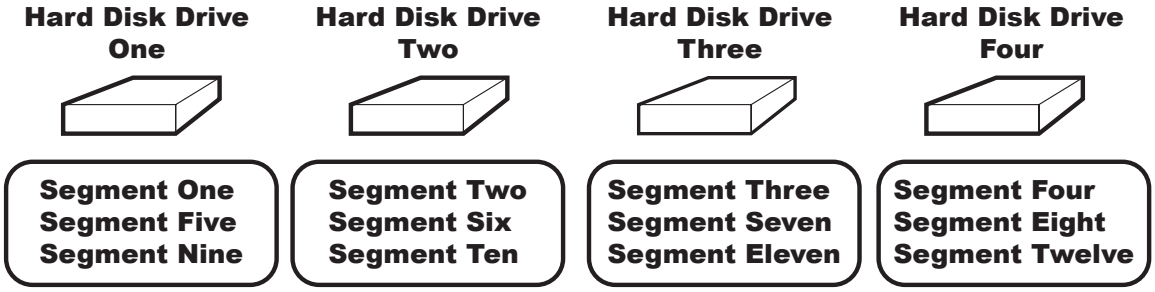
## RAID Overview

RAID is a collection of specifications that describe a system for ensuring the reliability and stability of data stored on large hard disk drive subsystems. A RAID system can be implemented in a number of different versions (or RAID Levels). The standard RAID levels are 0, 1, 3, and 5.

## Disk Striping

Disk striping writes data across multiple hard disk drives instead of just one hard disk drive. Disk striping involves partitioning each hard disk drive storage space into stripes that can vary in size. These stripes are interleaved in a repeated sequential manner. The combined storage space is composed of stripes from each drive. *StorTrends NAS Software* supports stripe sizes of 8 KB to 512 KB.

For example, in a four hard disk drive system using only disk striping (as in RAID level 0), segment one is written to hard disk drive one, segment two is written to hard disk drive two, and so on. Disk striping enhances performance because multiple hard disk drives are accessed simultaneously; but disk striping does not provide data redundancy.

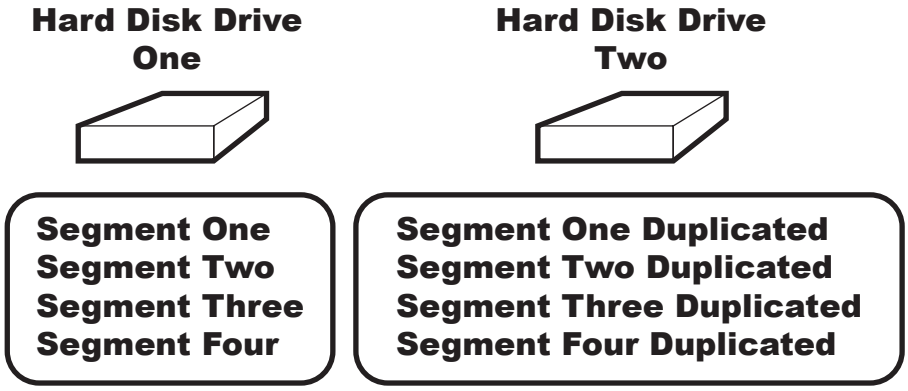



| Terminology | Description |
|---|---|
| Stripe Width | Stripe width is the number of hard disk drives involved in a volume where striping is implemented. For example, a four hard disk drive volume with disk striping has a stripe width of four. |
| Stripe Size | The stripe size is the length of the interleaved data segments that are written across multiple hard disk drives. |

## Disk Mirroring

With mirroring (used in RAID 1), data written to one hard disk drive is simultaneously written to another hard disk drive. If one hard disk drive fails, the contents of the other hard disk drive can be used to run the system and regenerate the failed hard disk drive. The primary advantage of disk mirroring is that it provides 100% data redundancy. Since the contents of the hard disk drive are completely written to a second hard disk drive, it does not matter if one of the hard disk drives fails. Both hard disk drives contain the same data at all times. Either hard disk drive can act as the operational hard disk drive.

Disk mirroring provides 100% redundancy, but is expensive because each hard disk drive in the system must be duplicated.



## Selecting a RAID Level

There are six official RAID levels (RAID 0 through RAID 5). The *StorTrends NAS Software* supports RAID levels 0, 1, and 5.

| RAID Level | Type |
|---|---|
| 0 | Standard |
| 1 | Standard |
| 5 | Standard |

To ensure the best performance, you should select the optimal RAID level when you create a system volume. The optimal RAID level for your volume depends on a number of factors:

- the number of hard disk drives in the NAS server
- the capacity of the hard disk drives in the NAS server
- the need for data redundancy
- the hard disk drive performance requirements

The factors you need to consider when selecting a RAID level are listed below:

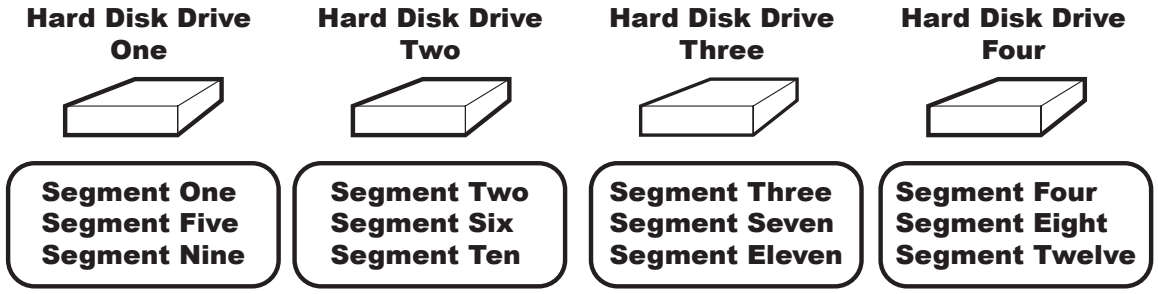
| Level | Description and Use | Pros | Cons | Max. Hard Disk Drives | Fault Tolerant |
|---|---|---|---|---|---|
| 0 | Data divided in blocks and distributed sequentially (pure striping). Use for non-critical data that requires high performance. | High data throughput for large files | No fault tolerance. All data lost if any hard disk drive fails. | one to 32 | no |
| 1 | Data duplicated on another hard disk drive (mirroring). Use for read-intensive fault-tolerant systems | 100% data redundancy | Reduces total hard disk drive space by half. Reduced performance during rebuilds. | two | yes |
| 5 | Disk striping and parity data across all hard disk drives. Use for high read volume but low write volume, such as transaction processing. | Achieves data redundancy at low cost | Performance not as good as RAID 1 | three to 32 | yes |

## RAID 0

RAID 0 provides disk striping across all hard disk drives in the volume. RAID 0 does not provide any data redundancy, but does offer the best performance of any RAID level. RAID 0 breaks up data into smaller blocks and then writes a block to each hard disk drive in the volume. The size of each block is determined by the stripe size parameter, set during the creation of the RAID set. RAID 0 offers high bandwidth.

By breaking up a large file into smaller blocks, *StorTrends NAS Software* can use multiple IDE/SCSI channels and hard disk drives to read or write to the file faster. RAID 0 involves no parity calculations to complicate the write operation. This makes RAID 0 ideal for applications that require high bandwidth but do not require fault tolerance.

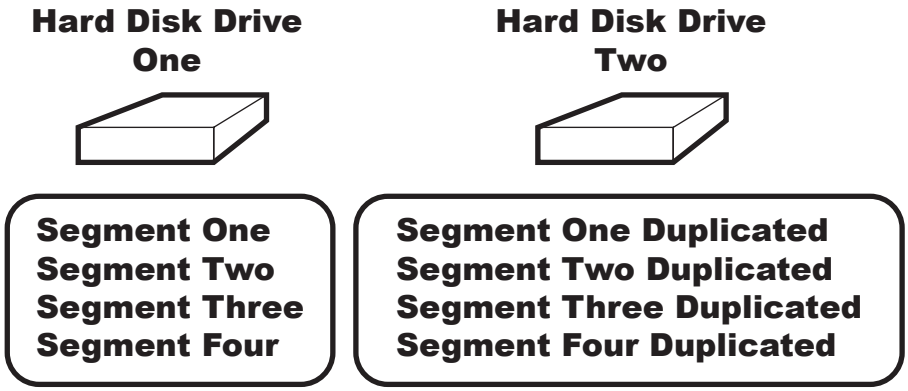
| Point | Description |
|---|---|
| uses | RAID 0 provides high data throughput, especially for large files. Any environment that does not require fault tolerance. |
| strong points | Provides increased data throughput for large files. No capacity loss penalty for parity. |
| weak points | Does not provide fault tolerance. All data lost if any hard disk drive fails. |
| hard disk drives | One to 32 hard disk drives |



## RAID 1

RAID 1 duplicates all data from one hard disk drive to a second hard disk drive. RAID 1 provides complete data redundancy, but at the cost of doubling the required data storage capacity.

| Point | Description |
|---|---|
| uses | Use RAID 1 for small databases or any other environment that requires fault tolerance but small capacity. |
| strong points | RAID 1 provides complete data redundancy. RAID 1 is ideal for any application that requires fault tolerance and minimal capacity. |
| weak points | RAID 1 requires twice as many hard disk drives. Performance is impaired during hard disk drive rebuilds. |
| hard disk drives | Two hard disk drives |

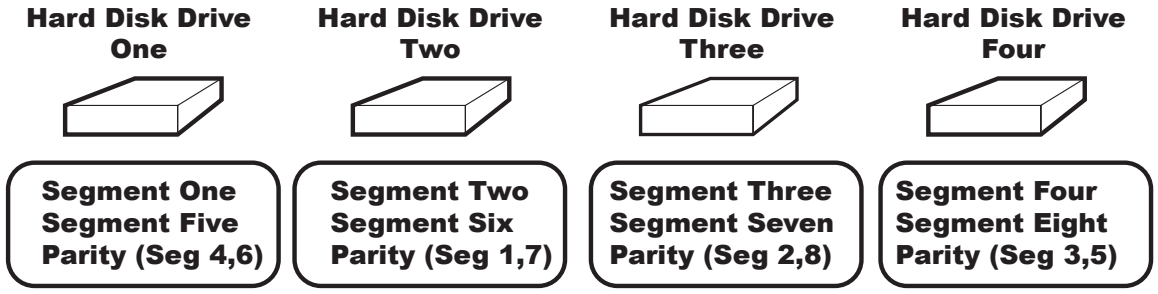


## RAID 5

RAID 5 includes disk striping at the byte level and parity. In RAID 5, the parity information is written to several hard disk drives. RAID 5 is best suited for networks that perform a lot of small I/O transactions simultaneously.

RAID 5 addresses the bottleneck issue for random I/O operations. Since each hard disk drive contains both data and parity numerous writes can take place concurrently. In addition, robust caching algorithms and hardware based exclusive-or assist make RAID 5 performance exceptional in many different environments.

| Point | Description |
|---|---|
| uses | RAID 5 provides high data throughput, especially for large files. Use RAID 5 for transaction processing applications because each hard disk drive can read and write independently. If a hard disk drive fails, the *StorTrends NAS Software* uses the parity stored on each of the other hard disk drives to recreate all missing information. Use also for office automation and online customer service that requires fault tolerance. Use for any application that has high read request rates but low write request rates. |
| strong points | Provides data redundancy and good performance in most environments |
| weak points | Hard disk drive performance will be reduced if a hard disk drive is being rebuilt. Environments with few processes do not perform as well because the RAID overhead is not offset by the performance gains in handling simultaneous processes. |
| hard disk drives | Three to 32 hard disk drives |




**Parity is distributed across all hard disk drives.**

# Glossary

**ACL**

Access Control List. An ACL is a table that tells the system's operating system the access rights each user has to a directory or file. The directory or file has a security attribute that identifies its access control list. The list has an entry for each system user with access privileges, such as read and write.

Microsoft® Windows® NT/2000, Novell® NetWare®, Hewlett-Packard® OpenVMS™ and UNIX® system-based systems are among the operating systems that use access control lists. The list is implemented differently by each operating system.

---

**Active Directory™**

*Active Directory*™ presents organizations with a directory service designed for distributed computing environments. *Active Directory*™ allows organizations to centrally manage and share information on network resources and users while acting as the central authority for network security. In addition to providing comprehensive directory services to a Microsoft® Windows® environment, *Active Directory*™ is designed to be a consolidation point for isolating, migrating, centrally managing, and reducing the number of directories that companies require.

*Active Directory*™ is the integral directory service within the Microsoft® Windows® 2000 operating system. This service improves manageability, enables security and extends interoperability between Microsoft® Windows® 2000 and other operating systems.

---

**Alert**

An alert gives you information or to warn you about a potentially damaging operation. StorTrends NAS software has an alert manager that sends out alerts using the following methods:

- SNMP traps
- E-mail alerts
- LCD
- Local event log

All the events are stored in a local event log. Based on the configuration, the alert manager sends the alerts to SNMP trap and e-mail destinations.

---

**AppleTalk®**

To share files, Apple® systems needs a network file protocol called AppleTalk® File Protocol (AFP), similar to NFS or CIFS.

---

**Appliance**

An appliance is a device that is purpose built, requires little or no time to setup, and most of all, simple to use. A good example of an appliance is a refrigerator.

---

**Archive**

The StorTrends NAS software uses this word to describe the process of backing up data stored on it to a safe place.

---

**Authentication**

Authentication is the process of determining whether someone or something is, in fact, who or what it declares itself to be. In private and public computer networks (including the Internet), authentication is commonly done through the use of logon passwords.

---

**Base DN**

Base Distinguished Name. For example, ami.com would be as follows:

**CN=USERS,DC=AMI,DC=COM**

---

**Capacity**

The size of a hard disk drive, storage device, or *Volume*.

---

**Data**

Distinct pieces of information usually formatted in a special way.

---

**DHCP**

Dynamic Host Configuration Protocol. Enables individual computers on an IP network to extract their configurations from a DHCP server.

---

**Domain**

A group of computers and devices on a network that are administered as a unit with common rules and procedures All devices sharing a common part of the IP address are said to be in the same domain.

---

**Domain Controller**

A server with a Microsoft® Windows® 2000/NT operating system and Active Directory™ enabled.

---

**Domain Name**

That part of the Uniform Resource Locator (URL) that tells a domain name server using the domain name system (DNS) whether and where to forward a request for a Web page. The domain name is mapped to an IP address.

---

**Ethernet**

Ethernet is a registered trademark of the Xerox Corporation. It describes the way data packets are transferred between computers on a local area network (LAN).

**Ethernet 802.2**

Packet format that defines the standard for the data link layer. It is made up of two smaller layers called the logical link control (LLC) layer and the media access control (MAC) layer.

```
+-----------+--------+---------+-------+-------+-------+----------
|destination| source |  length |  DSAP | SSAP  |control| data  >
+-----------+--------+---------+-------+-------+-------+----------
                              <  1  > <  1   > <  1  > < 43-1497 >
```

**Ethernet 802.3**

Packet format that defines the data link layer of a packet for bus type networks that use Carrier Sense Multiple Access / Collision Detection (CSMA/CD). The most common bus type networks are 10Base-T, 100Base-T (Fast Ethernet), and 1000Base-T (Gigabit Ethernet) networks. The letter *T* at the end designates RJ-45 Category 5 cable.

Ethernet 802.3 the standard that is used in most Ethernet cards and cables.

```
+-----------+--------+---------+----------
|destination| source |  length |  data  >
+-----------+--------+---------+----------
 <    6    > <   6  > <   2   > < 46-1500 >
```

**Ethernet II**

Packet format that defines the data link layer of a packet. This is the original Ethernet standard.

```
+-----------+--------+---------+----------
|destination| source |  type   |  data  >
+-----------+--------+---------+----------
 <    6    > <   6  > <   2   > < 46-1500 >
```

**Ethernet snap**

Packet format that has its own definition.

```
+-----------+--------+---------+-------+-------+-------+-----------+--------+-----------
|destination| source | length  |  AA   |  AA   |  03   |  org code |  type  | data  >
+-----------+--------+---------+-------+-------+-------+-----------+--------+-----------
                                                      <    3    > <  2   > < 38-1492 >
```

**Firewall**

A set of related programs, located at a network gateway server that protects the resources of a private network from users from other networks.

---

**Frame**

A frame is a single data packet that is transmitted across a network.

---

**FTP**

An application protocol commonly used to transfer Web page files from their creator to the computer that acts as their server for everyone on the Internet. Also commonly used to download programs and other files to your computer from other servers.

---

**Gateway**

A combination of hardware and software that links two different types of networks.

---

**Gigabyte**

A Gigabyte is one trillion Bytes of data. Most hard disk drive manufacturers follow the metric conventions of Kilobyte, Megabyte, and Gigabytes for specifying the drive capacity on their label and specifications (for example, 1000 B =1 KB, 1000 KB=1 MB and 1000 MB=1 GB) instead of the 1024 convention.

For example, given a manufacturer-specified 18.4 GB hard disk, the actual capacity reported by the disk is 17930455 KB = 17930455 *1024 = 18360785920 Bytes. This, if converted to metric convention, results in the specified 18.36 GB capacity rounded up. Thus, the actual capacity of the 18.4GB drive is displayed as 17.1 GB.

---

**Group**

A group is a number of users that are bunched together. Having a group makes it easier to assign a set of rules that are common to a set of users. Common groups can be Accounting, Sales, Marketing, and so on.

---

**Host**

A computer that is connected to a TCP/IP network, including the Internet. Each host has a unique IP address.

---

**HTTP**

An application protocol that is the set of rules for exchanging files (text, graphic images, sound, video, and other multimedia files) on the World Wide Web.

---

**Internet**

A global wide area network connecting millions of computers.

---

**IP Address**

A 32-bit numeric address written as four numbers separated by periods. Each number can be zero to 255.

---

**IPv6**

Internet Protocol next generation, A new version of the Internet Protocol (IP). The official name of IPng is IPv6, where the v6 stands for version 6.

---

**IPX**

Internetwork Packet Exchange. IPX is a networking protocol used by the Novell® NetWare® operating systems. IPX allows the StorTrends NAS software to be used in a pure NetWare® systems environment.

---

**ISP**

Internet Service Provider. This is a company that provide Internet access.

---

**Journaling**

A Journaling File System (JFS) enables easy file system recovery and ensures no loss of data in the event of an unscheduled downtime. It provides efficient formatting when new drives are added and it allows quick recovery after abnormal shutdowns.

---

**Mail Server**

A Mail Server is a system that accepts incoming electronic messages (email) and stores them until requested by the recipient of that message.

---

**MIB**

Management Information Base - A formal description of a set of network object that can be managed using the Simple Network Management Protocol. The format of the MIB is defined as part of the SNMP.

---

**NAS**

Network Attached Storage. Basically, an appliance that is purposely built as a networked storage device and meant to be easy to set up, configure, and use.

---

**NDMP**

Network Data Management Protocol. It is the industry standard network based tape backup protocol. The data can be backed up and restored using any NDMP compatible backup software.

---

**Network**

A group of two or more computer systems linked together.

---

**NIC**

Network Interface Card. Commonly as a network adapter or network card.

---

**NIS**

Network Information System. Developed by Sun™ Microsystems, NIS is a distributed naming and directory service originally called Yellow Pages™ or YP. It is a mechanism for identifying and locating network objects and resources. It provides a uniform storage and retrieval method for network-wide information in a transport-protocol and media-independent fashion.

NIS is a network naming and administration system typically used for smaller networks. Using NIS, each host, client or server in the system has knowledge about the entire system. A user at any host can get access to files or applications on any host in the network with a single user identification and password. It is intended for use on local area networks. NIS uses the client/server model and the Remote Procedure Call (RPC) interface for communication between hosts. NIS consists of a server, a library of client programs, and some administrative tools. NIS is often used with the Network File System (NFS). NIS is a UNIX® system-based application.

---

**Node**

A processing location. Can be a computer or some other device, such as a printer. Every node has a unique network address.

---

**Notification**

A notification is a message sent via email stating something is wrong or that something happened on the NAS server.

---

**NTP**

Network Time Protocol. Used to synchronizes the time of the NAS server automatically.

---

**Open**

An open system (as opposed to a proprietary system) is one that adheres to a publicly known and sometimes standard set of interfaces so that anyone using it can also use any other system that adheres to the standard.

---

**OSI**

Open System Interconnection, an ISO standard for worldwide communications that defines a networking framework for implementing protocols in seven layers.

---

**OSI Layer 3**

Network Layer that routes data from one node to another.

---

**Packet**

A piece of a message transmitted over a packet-switching network. Contains the destination address in addition to the data. In IP networks, packets are often called datagrams.

---

**Parameters**

A value used to define a characteristic.

---

**Protocol**

A special set of rules that end points in a telecommunication connection uses when they communicate.

---

**Proxy Server**

A server that acts as an intermediary between a workstation user and the Internet so that the enterprise can ensure security, administrative control, and caching service.

---

**Quota**

A quota is the maximum amount of space a user is allowed to use on the NAS server.

StorTrends NAS software provides quota support on a per volume basis. This quota can be set for every individual user. If the quota is set to zero, it means the user has unlimited storage access. If the quota is set to a particular size it means the user has only that much amount of storage at his/her access in that volume.

---

**RAID 0**

RAID 0 provides disk striping across all hard disk drives in the volume. RAID 0 does not provide any data redundancy, but does offer the best performance of any RAID level. RAID 0 breaks up data into smaller blocks and then writes a block to each hard disk drive in the volume. The size of each block is determined by the stripe size parameter, set during the creation of the RAID set. RAID 0 offers high bandwidth.

By breaking up a large file into smaller blocks, *StorTrends NAS Software* can use multiple IDE/SCSI channels and hard disk drives to read or write to the file faster. RAID 0 involves no parity calculations to complicate the write operation. This makes RAID 0 ideal for applications that require high bandwidth but do not require fault tolerance.

---

**RAID 1**

RAID 1 duplicates all data from one hard disk drive to a second hard disk drive. RAID 1 provides complete data redundancy, but at the cost of doubling the required data storage capacity.

---

**RAID 5**

RAID 5 includes disk striping at the byte level and parity. In RAID 5, the parity information is written to several hard disk drives. RAID 5 is best suited for networks that perform a lot of small I/O transactions simultaneously.

RAID 5 addresses the bottleneck issue for random I/O operations. Since each hard disk drive contains both data and parity numerous writes can take place concurrently. In addition, robust caching algorithms and hardware based exclusive-or assist make RAID 5 performance exceptional in many different environments.

---

**RAID Level**

A RAID level in the StorTrends NAS Software can be either RAID 0, RAID 1, or RAID 5.

---

**Mirrored OS**

AMI has added Mirrored operating system (OS) capabilities to the StorTrends NAS software in the 2.1 version release. Mirroring the NAS OS is the ability to install the NAS software on two hard disk drives. Basically, if one of the two boot hard disk drives fail, you still maintain the ability to boot to the NAS OS from the alternate hard disk drive.

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**Router**

A device or, in some cases, software in a computer, that is connected to at least two networks and decides which way to send each information packet based on its current understanding of the state of the networks it is connected to.

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**SAN**

Storage Area Network. It is a network of shared storage devices. Its architecture works in a way that makes all storage devices available to all servers on a LAN or WAN. As more storage devices are added to a SAN, they too will be accessible from any server in the larger network. In this case, the server merely acts as a pathway between the end user and the stored data.

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**Schedule**

Scheduling allows you set the frequency that the NAS server takes a snapshot image. The options are *Never*, *Hourly*, *Daily*, and *Weekly*.

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**Server**

A program that awaits and fulfills requests from client programs in the same or other computers. A given application in a computer may function as a client with requests for services from other programs and also as a server of requests from other programs.

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**Share**

A share is a folder that has specific read/write attributes. You can specify that only certain users and groups can access the folder.

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**SMB**

Server Message Block. Provides a method for client applications in a computer to read and write to files on and to request services from server programs in a computer network. SMB can be used over the Internet on top of its TCP/IP protocol or on top of other network protocols such as Internet Packet Exchange (IPX) and NetBEUI.

---

**Snapshot**

A snapshot service gives you a nearly instantaneous virtual copy of your storage volume with no interruption of service. The underlying backup technology creates an instantaneous copy of the data being backed up. This is typically accomplished by splitting a mirrored set of disks or creating a copy of a disk block when it is written, preserving the original. At restore time, the original is made available immediately, resulting in almost instantaneous restores.

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**SNMP**

Short for Simple Network Management Protocol, a set of protocols for managing complex networks. The first versions of SNMP were developed in the early 80s. SNMP works by sending messages, called protocol data units (PDUs), to different parts of a network. SNMP-compliant devices, called agents, store data about themselves in Management Information Bases (MIBs) and return this data to the SNMP requesters.

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**State**

A state is a text description or status used to describe whether or not the hardware feature is within reasonable temperature, voltage, or revolutions per minute thresholds.

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**Stripe Size**

Disk striping writes data across multiple hard disk drives instead of just one hard disk drive. Disk striping involves partitioning each hard disk drive storage space into stripes that can vary in size. These stripes are interleaved in a repeated sequential manner. The combined storage space is composed of stripes from each drive. *StorTrends NAS Software* supports stripe sizes of 8 KB to 512 KB.

For example, in a four hard disk drive system using only disk striping (as in RAID level 0), segment one is written to hard disk drive one, segment two is written to hard disk drive two, and so on. Disk striping enhances performance because multiple hard disk drives are accessed simultaneously; but disk striping does not provide data redundancy.

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**Subnet Mask**

A mask used to determine what subnet an IP address belongs to. An IP address has two components, the network address and the host address. Subnetting enables the network administrator to further divide the host part of the address into two or more subnets. A part of the host address is reserved to identify the particular subnet.

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**Switch**

A network device that selects a path or circuit for sending a unit of data to its next destination.

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**TCP**

Transmission Control Protocol. One of the main protocols in TCP/IP networks. Enables two hosts to establish a connection and exchange streams of data.

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**TCP/IP**

Transmission Control Protocol/Internet Protocol, the suite of communications protocols used to connect hosts on the Internet. TCP/IP uses several protocols, the two main ones being TCP and IP.

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**Upgrade**

To upgrade means that you are replacing an old version of a software product with a newer version of the same product.

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**User DN**

User Distinguished Name. For example, marketing users on the ami.com domain would be entered as follows:

**CN=ADMINNAME,CN=USERS,DC=AMI,DC=COM**

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**Volume**

A *Volume* is a fixed amount of storage. One *Volume* can span over more than one physical hard disk drive. It all depends on how you set up your *Volumes*.

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**WINS**

WINS is a system that determines the IP address associated with a particular network computer. This is called name resolution. WINS supports network client and server computers running Microsoft® Windows® operating system and can provide name resolution for other computers with special arrangements. You must enter the IP Address for that server if one is used in your network.

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**XFS**

XFS combines advanced Journaling technology with full 64-bit addressing and scalable structures and algorithms. This combination delivers the most scalable and high-performance file system in the world and is fully supported by the StorTrends NAS Software.

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